Canadian Year-Round Shipping Traffic Atlas for 2013: Volume 3, West Coast

Yvan Simard, Nathalie Roy, Samuel Giard, and Mehmet Yayla

Fisheries and Oceans Canada
Science Branch
Maurice Lamontagne Institute
850 route de la Mer, P.O. Box 1000
Mont-Joli, Québec
Canada G5H 3Z4

2014

Canadian Technical Report of Fisheries and Aquatic Sciences 3091(Vol.3)E

Canadä

Canadian Technical Report of Fisheries and Aquatic Sciences

Technical reports contain scientific and technical information that contributes to existing knowledge but which is not normally appropriate for primary literature. Technical reports are directed primarily toward a worldwide audience and have an international distribution. No restriction is placed on subject matter and the series reflects the broad interests and policies of Fisheries and Oceans Canada, namely, fisheries and aquatic sciences.

Technical reports may be cited as full publications. The correct citation appears above the abstract of each report. Each report is abstracted in the data base *Aquatic Sciences and Fisheries Abstracts*.

Technical reports are produced regionally but are numbered nationally. Requests for individual reports will be filled by the issuing establishment listed on the front cover and title page.

Numbers 1-456 in this series were issued as Technical Reports of the Fisheries Research Board of Canada. Numbers 457-714 were issued as Department of the Environment, Fisheries and Marine Service, Research and Development Directorate Technical Reports. Numbers 715-924 were issued as Department of Fisheries and Environment, Fisheries and Marine Service Technical Reports.The current series name was changed with report number 925.

Rapport technique canadien des sciences halieutiques et aquatiques

Les rapports techniques contiennent des renseignements scientifiques et techniques qui constituent une contribution aux connaissances actuelles, mais qui ne sont pas normalement appropriés pour la publication dans un journal scientifique. Les rapports techniques sont destinés essentiellement à un public international et ils sont distribués à cet échelon. Il n'y a aucune restriction quant au sujet; de fait, la série reflète la vaste gamme des intérêts et des politiques de Pêches et Océans Canada, c'est-à-dire les sciences halieutiques et aquatiques.

Les rapports techniques peuvent être cités comme des publications à part entière. Le titre exact figure au-dessus du résumé de chaque rapport. Les rapports techniques sont résumés dans la base de données *Résumés des sciences aquatiques et halieutiques*.

Les rapports techniques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre.

Les numéros 1 à 456 de cette série ont été publiés à titre de Rapports techniques de l'Office des recherches sur les pêcheries du Canada. Les numéros 457 à 714 sont parus à titre de Rapports techniques de la Direction générale de la recherche et du développement, Service des pêches et de la mer, ministère de l'Environnement. Les numéros 715 à 924 ont été publiés à titre de Rapports techniques du Service des pêches et de la mer, ministère des Pêches et de l'Environnement. Le nom actuel de la série a été établi lors de la parution du numéro 925.

Canadian Technical Report of
Fisheries and Aquatic Sciences 3091(Vol.3)E

2014

Canadian Year-Round Shipping Traffic Atlas for 2013: Volume 3, West Coast

by

Yvan Simard[1], Nathalie Roy[1], Samuel Giard[2], and Mehmet Yayla[1]

[1]Fisheries and Oceans Canada
Sciences Branch
Maurice Lamontagne Institute
850 route de la Mer, P.O. Box 1000
Mont-Joli, Québec
Canada G5H 3Z4

[2]36253 Chateaubriand
Montréal, Québec
Canada H2S-2N5

© Her Majesty the Queen in Right of Canada, 2014
Cat. No. Fs 97-6/3091(Vol.3)E-PDF ISBN 978-1-100-23768-8 ISSN 1488-5379

Correct citation for this publication:

Simard, Y., Roy, N., Giard, S., and Yayla, M. 2014. Canadian year-round shipping traffic atlas for 2013: Volume 3, West Coast. Can. Tech. Rep. Fish. Aquat. Sci. 3091(Vol.3)E: xviii + 327 pp.

TABLE OF CONTENTS

Page

LIST OF TABLES iv
LIST OF FIGURES iv
ABSTRACT xviii
RÉSUMÉ xviii
1. INTRODUCTION 1
2. MATERIALS AND METHODS 2
  2.1. AIS DATA BANK 2
  2.2. DATA PROCESSING 3
3. RESULTS 9
4. DISCUSSION 9
5. ACKNOWLEDGMENTS 10
6. REFERENCES 11
7. YEARLY TRAFFIC MAPS 12
  All AIS traffic 12
  AIS traffic by ship types 19
  AIS traffic by ship length classes 27
  AIS traffic by speed categories 33
8. MONTHLY TRAFFIC MAPS 39
  8.1. JANUARY 2013 40
  8.2. FEBRUARY 2013 64
  8.3. MARCH 2013 88
  8.4. APRIL 2013 112
  8.5. MAY 2013 136
  8.6. JUNE 2013 160
  8.7. JULY 2013 184
  8.8. AUGUST 2013 208
  8.9. SEPTEMBER 2013 232
  8.10. OCTOBER 2013 256
  8.11. NOVEMBER 2013 280
  8.12. DECEMBER 2013 304

LIST OF TABLES

Table 1. Data fields of ASCII-txt files extracted from the recorded raw AIS data and used in the computation of the maps. 3
Table 2. Latitude and longitude limits of the study area used to compute the Cartesian grid. 4
Table 3. Parameters of the Lambert conformal conic equal-area projection used for the conversion of the positions in latitude and longitude into the Cartesian grid. These parameters conform to WGS 84 datum. 5
Table 4. Colour palette used to display the AIS shipping traffic in the atlas maps. 7

LIST OF FIGURES

Figure 1. Map of the study area on Canada's West Coast, showing the outer contour of the 1 km^2 mesh Cartesian grid (red rectangle) used for reporting the AIS shipping traffic density as delimited in Table 2, and the DFO-Coast Guard AIS antenna network (crosses), with radii of 100 km (blue circles). 4
Figure 2. Flow diagram of the AIS data processing for computing the various shipping traffic maps of the atlas. 8
Figure 3. Map of all AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 13
Figure 4. Map of the 5th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 14
Figure 5. Map of the 25th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 15
Figure 6. Map of the 50th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 16
Figure 7. Map of the 75th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 17
Figure 8. Map of the 95th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 18
Figure 9. Map of AIS mean traffic density of cargo-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 20
Figure 10. Map of AIS mean traffic density of tanker-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 21
Figure 11. Map of AIS mean traffic density of passenger-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 22
Figure 12. Map of AIS mean traffic density of tug and towing -type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 23
Figure 13. Map of AIS mean traffic density of fishing-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 24
Figure 14. Map of AIS mean traffic density of pleasure-type vessels in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 25
Figure 15. Map of AIS mean traffic density of other type of ships and ships of unidentified type in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 26
Figure 16. Map of AIS mean traffic density of ships with lengths < 10 min 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 28

Figure 17. Map of AIS mean traffic density of 10 to 50 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 29
Figure 18. Map of AIS mean traffic density of 50 to 150 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 30
Figure 19. Map of AIS mean traffic density of 150 to 250 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 31
Figure 20. Map of AIS mean traffic density of > 250 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 32
Figure 21. Map of 2–5 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 34
Figure 22. Map of 5–10 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 35
Figure 23. Map of 10–15 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 36
Figure 24. Map of 15–20 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 37
Figure 25. Map of >20 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 38
Figure 26. Map of AIS mean traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 41
Figure 27. Map of the 5th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 42
Figure 28. Map of the 25th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 43
Figure 29. Map of the 50th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 44
Figure 30. Map of the 75th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 45
Figure 31. Map of the 95th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 46
Figure 32. Map of AIS mean traffic density of cargo-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 47
Figure 33. Map of AIS mean traffic density of tanker-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 48
Figure 34. Map of AIS mean traffic density of passenger-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 49
Figure 35. Map of AIS mean traffic density of tug and towing -type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 50
Figure 36. Map of AIS mean traffic density of fishing-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 51
Figure 37. Map of AIS mean traffic density of pleasure-type vessels in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 52
Figure 38. Map of AIS mean traffic density of other type of ships and ships of unidentified type in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 53
Figure 39. Map of AIS mean traffic density of ships with lengths < 10 min January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 54

Figure 40. Map of AIS mean traffic density of 10 to 50 m ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 55

Figure 41. Map of AIS mean traffic density of 50 to 150 m ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 56

Figure 42. Map of AIS mean traffic density of 150 to 250 m ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 57

Figure 43. Map of >250 m ship AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 58

Figure 44. Map of 2–5 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 59

Figure 45. Map of 5–10 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 60

Figure 46. Map of 10–15 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 61

Figure 47. Map of 15–20 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 62

Figure 48. Map of >20 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 63

Figure 49. Map of AIS mean traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 65

Figure 50. Map of the 5th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 66

Figure 51. Map of the 25th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 67

Figure 52. Map of the 50th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 68

Figure 53. Map of the 75th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 69

Figure 54. Map of the 95th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 70

Figure 55. Map of AIS mean traffic density of cargo-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 71

Figure 56. Map of AIS mean traffic density of tanker-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 72

Figure 57. Map of AIS mean traffic density of passenger-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 73

Figure 58. Map of AIS mean traffic density of tug and towing -type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 74

Figure 59. Map of AIS mean traffic density of fishing-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 75

Figure 60. Map of AIS mean traffic density of pleasure-type vessels in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 76

Figure 61. Map of AIS mean traffic density of other type of ships and ships of unidentified type in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 77

Figure 62. Map of AIS mean traffic density of ships with lengths < 10 min February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 78

Figure 63. Map of AIS mean traffic density of 10 to 50 m ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 79

Figure 64. Map of 50 to 150 m ship AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 80

Figure 65. Map of AIS mean traffic density of 150 to 250 m ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 81

Figure 66. Map of >250 m ship AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 82

Figure 67. Map of 2–5 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 83

Figure 68. Map of 5–10 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 84

Figure 69. Map of 10–15 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 85

Figure 70. Map of 15–20 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 86

Figure 71. Map of >20 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 87

Figure 72. Map of AIS mean traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 89

Figure 73. Map of the 5th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 90

Figure 74. Map of the 25th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 91

Figure 75. Map of the 50th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 92

Figure 76. Map of the 75th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 93

Figure 77. Map of the 95th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 94

Figure 78. Map of AIS mean traffic density of cargo-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 95

Figure 79. Map of AIS mean traffic density of tanker-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 96

Figure 80. Map of AIS mean traffic density of passenger-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 97

Figure 81. Map of AIS mean traffic density of tug and towing -type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 98

Figure 82. Map of AIS mean traffic density of fishing-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 99

Figure 83. Map of AIS mean traffic density of pleasure-type vessels in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 100

Figure 84. Map of AIS mean traffic density of other type of ships and ships of unidentified type in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 101

Figure 85. Map of AIS mean traffic density of ships with lengths < 10 min March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 102

Figure 86. Map of AIS mean traffic density of 10 to 50 m ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 103

Figure 87. Map of AIS mean traffic density of 50 to 150 m ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 104

Figure 88. Map of AIS mean traffic density of 150 to 250 m ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 105

Figure 89. Map of >250 m ship AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 106

Figure 90. Map of 2–5 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 107

Figure 91. Map of 5–10 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 108

Figure 92. Map of 10–15 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 109

Figure 93. Map of 15–20 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 110

Figure 94. Map of >20 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 111

Figure 95. Map of AIS mean traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 113

Figure 96. Map of the 5th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 114

Figure 97. Map of the 25th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 115

Figure 98. Map of the 50th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 116

Figure 99. Map of the 75th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 117

Figure 100. Map of the 95th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 118

Figure 101. Map of AIS mean traffic density of cargo-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 119

Figure 102. Map of AIS mean traffic density of tanker-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 120

Figure 103. Map of AIS mean traffic density of passenger-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 121

Figure 104. Map of AIS mean traffic density of tug and towing -type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 122

Figure 105. Map of AIS mean traffic density of fishing-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 123

Figure 106. Map of AIS mean traffic density of pleasure-type vessels in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 124

Figure 107. Map of AIS mean traffic density of other type of ships and ships of unidentified type in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 125
Figure 108. Map of AIS mean traffic density of ships with lengths < 10 min April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 126
Figure 109. Map of AIS mean traffic density of 10 to 50 m ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 127
Figure 110. Map of AIS mean traffic density of 50 to 150 m ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 128
Figure 111. Map of AIS mean traffic density of 150 to 250 m ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 129
Figure 112. Map of >250 m ship AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 130
Figure 113. Map of 2–5 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 131
Figure 114. Map of 5–10 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 132
Figure 115. Map of 10–15 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 133
Figure 116. Map of 15–20 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 134
Figure 117. Map of >20 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 135
Figure 118. Map of AIS mean traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 137
Figure 119. Map of the 5th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 138
Figure 120. Map of the 25th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 139
Figure 121. Map of the 50th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 140
Figure 122. Map of the 75th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 141
Figure 123. Map of the 95th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 142
Figure 124. Map of AIS mean traffic density of cargo-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 143
Figure 125. Map of AIS mean traffic density of tanker-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 144
Figure 126. Map of AIS mean traffic density of passenger-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 145
Figure 127. Map of AIS mean traffic density of tug and towing -type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 146
Figure 128. Map of AIS mean traffic density of fishing-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 147
Figure 129. Map of AIS mean traffic density of pleasure-type vessels in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 148

Figure 130. Map of AIS mean traffic density of other type of ships and ships of unidentified type in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 149
Figure 131. Map of AIS mean traffic density of ships with lengths < 10 min May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 150
Figure 132. Map of AIS mean traffic density of 10 to 50 m ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 151
Figure 133. Map of AIS mean traffic density of 50 to 150 m ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 152
Figure 134. Map of AIS mean traffic density of 150 to 250 m ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 153
Figure 135. Map of >250 m ship AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 154
Figure 136. Map of 2–5 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 155
Figure 137. Map of 5–10 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 156
Figure 138. Map of 10–15 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 157
Figure 139. Map of 15–20 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 158
Figure 140. Map of >20 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 159
Figure 141. Map of AIS mean traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 161
Figure 142. Map of the 5th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 162
Figure 143. Map of the 25th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 163
Figure 144. Map of the 50th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 164
Figure 145. Map of the 75th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 165
Figure 146. Map of the 95th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 166
Figure 147. Map of AIS mean traffic density of cargo-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 167
Figure 148. Map of AIS mean traffic density of tanker-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 168
Figure 149. Map of AIS mean traffic density of passenger-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 169
Figure 150. Map of AIS mean traffic density of tug and towing -type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 170
Figure 151. Map of AIS mean traffic density of fishing-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 171
Figure 152. Map of AIS mean traffic density of pleasure-type vessels in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 172

Figure 153. Map of AIS mean traffic density of other type of ships and ships of unidentified type in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 173
Figure 154. Map of AIS mean traffic density of ships with lengths < 10 min June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 174
Figure 155. Map of AIS mean traffic density of 10 to 50 m ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 175
Figure 156. Map of AIS mean traffic density of 50 to 150 m ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 176
Figure 157. Map of AIS mean traffic density of 150 to 250 m ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 177
Figure 158. Map of >250 m ship AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 178
Figure 159. Map of 2–5 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 179
Figure 160. Map of 5–10 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 180
Figure 161. Map of 10–15 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 181
Figure 162. Map of 15–20 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 182
Figure 163. Map of >20 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 183
Figure 164. Map of AIS mean traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 185
Figure 165. Map of the 5th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 186
Figure 166. Map of the 25th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 187
Figure 167. Map of the 50th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 188
Figure 168. Map of the 75th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 189
Figure 169. Map of the 95th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 190
Figure 170. Map of AIS mean traffic density of cargo-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 191
Figure 171. Map of AIS mean traffic density of tanker-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 192
Figure 172. Map of AIS mean traffic density of passenger-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 193
Figure 173. Map of AIS mean traffic density of tug and towing -type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 194
Figure 174. Map of AIS mean traffic density of fishing-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 195
Figure 175. Map of AIS mean traffic density of pleasure-type vessels in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 196

Figure 176. Map of AIS mean traffic density of other type of ships and ships of unidentified type in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 197

Figure 177. Map of AIS mean traffic density of ships with lengths < 10 min July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 198

Figure 178. Map of AIS mean traffic density of 10 to 50 m ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 199

Figure 179. Map of AIS mean traffic density of 50 to 150 m ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 200

Figure 180. Map of AIS mean traffic density of 150 to 250 m ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 201

Figure 181. Map of >250 m ship AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 202

Figure 182. Map of 2–5 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 203

Figure 183. Map of 5–10 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 204

Figure 184. Map of 10–15 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 205

Figure 185. Map of 15–20 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 206

Figure 186. Map of >20 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 207

Figure 187. Map of AIS mean traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 209

Figure 188. Map of the 5th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 210

Figure 189. Map of the 25th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 211

Figure 190. Map of the 50th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 212

Figure 191. Map of the 75th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 213

Figure 192. Map of the 95th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 214

Figure 193. Map of AIS mean traffic density of cargo-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 215

Figure 194. Map of AIS mean traffic density of tanker-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 216

Figure 195. Map of AIS mean traffic density of passenger-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 217

Figure 196. Map of AIS mean traffic density of tug and towing -type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 218

Figure 197. Map of AIS mean traffic density of fishing-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 219

Figure 198. Map of AIS mean traffic density of pleasure-type vessels in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 220

Figure 199. Map of AIS mean traffic density of other type of ships and ships of unidentified type in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 221
Figure 200. Map of AIS mean traffic density of ships with lengths < 10 min August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 222
Figure 201. Map of AIS mean traffic density of 10 to 50 m ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 223
Figure 202. Map of AIS mean traffic density of 50 to 150 m ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 224
Figure 203. Map of AIS mean traffic density of 150 to 250 m ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 225
Figure 204. Map of >250 m ship AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 226
Figure 205. Map of 2–5 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 227
Figure 206. Map of 5–10 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 228
Figure 207. Map of 10–15 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 229
Figure 208. Map of 15–20 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 230
Figure 209. Map of >20 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 231
Figure 210. Map of AIS mean traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 233
Figure 211. Map of the 5th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 234
Figure 212. Map of the 25th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 235
Figure 213. Map of the 50th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 236
Figure 214. Map of the 75th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 237
Figure 215. Map of the 95th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 238
Figure 216. Map of AIS mean traffic density of cargo-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 239
Figure 217. Map of AIS mean traffic density of tanker-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 240
Figure 218. Map of AIS mean traffic density of passenger-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 241

Figure 219. Map of AIS mean traffic density of tug and towing -type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 242
Figure 220. Map of AIS mean traffic density of fishing-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 243
Figure 221. Map of AIS mean traffic density of pleasure-type vessels in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 244
Figure 222. Map of AIS mean traffic density of other type of ships and ships of unidentified type in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 245
Figure 223. Map of AIS mean traffic density of ships with lengths < 10 min September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 246
Figure 224. Map of AIS mean traffic density of 10 to 50 m ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 247
Figure 225. Map of AIS mean traffic density of 50 to 150 m ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 248
Figure 226. Map of AIS mean traffic density of 150 to 250 m ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 249
Figure 227. Map of >250 m ship AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 250
Figure 228. Map of 2–5 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 251
Figure 229. Map of 5–10 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 252
Figure 230. Map of 10–15 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 253
Figure 231. Map of 15–20 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 254
Figure 232. Map of >20 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 255
Figure 233. Map of AIS mean traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 257
Figure 234. Map of the 5th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 258
Figure 235. Map of the 25th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 259
Figure 236. Map of the 50th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 260
Figure 237. Map of the 75th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 261
Figure 238. Map of the 95th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 262
Figure 239. Map of AIS mean traffic density of cargo-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 263
Figure 240. Map of AIS mean traffic density of tanker-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 264
Figure 241. Map of AIS mean traffic density of passenger-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 265

Figure 242. Map of AIS mean traffic density of tug and towing -type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 266

Figure 243. Map of AIS mean traffic density of fishing-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 267

Figure 244. Map of AIS mean traffic density of pleasure-type vessels in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 268

Figure 245. Map of AIS mean traffic density of other type of ships and ships of unidentified type in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 269

Figure 246. Map of AIS mean traffic density of ships with lengths < 10 min October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 270

Figure 247. Map of AIS mean traffic density of 10 to 50 m ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 271

Figure 248. Map of AIS mean traffic density of 50 to 150 m ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 272

Figure 249. Map of AIS mean traffic density of 150 to 250 m ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 273

Figure 250. Map of >250 m ship AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 274

Figure 251. Map of 2–5 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 275

Figure 252. Map of 5–10 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 276

Figure 253. Map of 10–15 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 277

Figure 254. Map of 15–20 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 278

Figure 255. Map of >20 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 279

Figure 256. Map of AIS mean traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 281

Figure 257. Map of the 5th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 282

Figure 258. Map of the 25th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 283

Figure 259. Map of the 50th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 284

Figure 260. Map of the 75th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 285

Figure 261. Map of the 95th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 286

Figure 262. Map of AIS mean traffic density of cargo-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 287

Figure 263. Map of AIS mean traffic density of tanker-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 288

Figure 264. Map of AIS mean traffic density of passenger-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 289

Figure 265. Map of AIS mean traffic density of tug and towing -type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 290

Figure 266. Map of AIS mean traffic density of fishing-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 291

Figure 267. Map of AIS mean traffic density of pleasure-type vessels in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 292

Figure 268. Map of AIS mean traffic density of other type of ships and ships of unidentified type in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 293

Figure 269. Map of AIS mean traffic density of ships with lengths < 10 min November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 294

Figure 270. Map of AIS mean traffic density of 10 to 50 m ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 295

Figure 271. Map of AIS mean traffic density of 50 to 150 m ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 296

Figure 272. Map of AIS mean traffic density of 150 to 250 m ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 297

Figure 273. Map of >250 m ship AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 298

Figure 274. Map of 2–5 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 299

Figure 275. Map of 5–10 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 300

Figure 276. Map of 10–15 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 301

Figure 277. Map of 15–20 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 302

Figure 278. Map of >20 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 303

Figure 279. Map of AIS mean traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 305

Figure 280. Map of the 5th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 306

Figure 281. Map of the 25th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 307

Figure 282. Map of the 50th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 308

Figure 283. Map of the 75th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 309
Figure 284. Map of the 95th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 310
Figure 285. Map of AIS mean traffic density of cargo-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 311
Figure 286. Map of AIS mean traffic density of tanker-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 312
Figure 287. Map of AIS mean traffic density of passenger-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 313
Figure 288. Map of AIS mean traffic density of tug and towing -type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 314
Figure 289. Map of AIS mean traffic density of fishing-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 315
Figure 290. Map of AIS mean traffic density of pleasure-type vessels in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 316
Figure 291. Map of AIS mean traffic density of other type of ships and ships of unidentified type in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 317
Figure 292. Map of AIS mean traffic density of ships with lengths < 10 min December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 318
Figure 293. Map of AIS mean traffic density of 10 to 50 m ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 319
Figure 294. Map of AIS mean traffic density of 50 to 150 m ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 320
Figure 295. Map of AIS mean traffic density of 150 to 250 m ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 321
Figure 296. Map of >250 m ship AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 322
Figure 297. Map of 2–5 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 323
Figure 298. Map of 5–10 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 324
Figure 299. Map of 10–15 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 325
Figure 300. Map of 15–20 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 326
Figure 301. Map of >20 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). 327

ABSTRACT

Simard, Y., Roy, N., Giard, S., and Yayla, M. 2014. Canadian year-round shipping traffic atlas in 2013: Volume 3, West Coast. Can. Tech. Rep. Fish. Aquat. Sci. 3091(Vol.3)E: xviii + 327 pp.

The Automatic Identification System (AIS) ship-tracking data collected by Fisheries and Oceans Canada's (DFO) Canadian Coast Guard (CCG) in southern Canadian waters were used to map traffic density throughout 2013. The region considered in this report is the West Coast. The AIS traffic maps are computed for the whole year and by month. The AIS traffic maps are provided for the whole year and by month. For each time period, maps of daily traffic density are provided for all vessel traffic and selectively for seven vessel types, five vessel length classes, and five sailing speed classes. The data were binned using a common metric of ship-h per 1 × 1 km grid cell per day for all maps. The cumulative histogram of traffic density, total area with traffic, and the sum of daily traffic density are provided for each map. The atlas contains a total of 299 traffic maps.

RÉSUMÉ

Simard, Y., Roy, N., Giard, S., and Yayla, M. 2014. Canadian year-round shipping traffic atlas in 2013: Volume 3, West Coast. Can. Tech. Rep. Fish. Aquat. Sci. 3091(Vol.3)E: xviii + 327 pp.

Les données du système AIS (*Automatic Identification System*) de suivi de la navigation maritime récoltées par la Garde Côtière canadienne du ministère des Pêches et des Océans (MPO) dans les eaux méridionales canadiennes sont utilisées pour cartographier l'intensité du trafic au cours de 2013. La région considérée dans ce rapport est celle de la Côte Ouest. Les cartes du trafic AIS sont fournies pour l'année entière ainsi que par mois. Pour chaque période, les cartes sont fournies pour le trafic total ainsi que séparément pour sept types de navires, cinq classes de longueur de navire et cinq classes de vitesse de transit. Une métrique commune, navire-h par cellule de 1 × 1 km par jour, est utilisée pour toutes les cartes. L'histogramme cumulé de la densité du trafic, l'aire totale avec trafic et la somme du trafic quotidien sont fournis pour chaque carte. L'atlas renferme un total de 299 cartes de trafic.

1. INTRODUCTION

Shipping is one of several human uses of deep oceans, continental shelves, and inland waters to transport goods that are essential to the world economy. The world merchandise trade increases about two times faster than the world gross domestic product (GDP) (UNCTAD 2013). With three bordering oceans, large marginal seas and straits, and an extended network of inland waters, Canada has extensive domestic and international cargo shipping. The worldwide growth rate of this industry changed from high in the 2000's to stagnant or negative after the 2008 global economic crisis (UNCTAD 2013). The amount of transported cargo and number of ships peaked in 2008 following a seven-fold increase since 2000. In January 2013, the transported cargo and the number of ships had respectively decreased to 40% and 33% of their 2008 peaks (UNCTAD 2013; their Table 2.10, p. 62-63). The average ship size has generally increased. This is particularly evident for general cargo ships and container vessels; the size of these latter has almost doubled since 2000. More than half of the global fleet is composed of new ships (< 10-years old).

Shipping can have various effects on several structural components and functions of aquatic ecosystems via diverse transmission pathways, including the discharge of contaminants, radiated underwater noise, introduction of aquatic invasive species, and ship strike risk (Simard et al. 2006, Clark et al. 2009, Simard et al. 2010, Bailey et al. 2012, DiBacco et al. 2012, Gervaise et al. 2012, van der Hoop et al. 2012, Greig and Abraham 2014). The probability and magnitude of these effects are often largely determined by the amount of temporal and spatial overlap of traffic density and vulnerable ecosystem components, the fleet composition, and the type of activity. Therefore, assessing the risk of shipping effects on ecosystems or particular species generally requires the temporal and spatial structure of the traffic and its composition. The possibilities of assembling such information for marine spatial planning using ship position data from the satellite-based long range identification and tracking (LRIT) system with geographic information system (GIS) techniques have been assessed for Atlantic Canada (Koropatnick et al. 2012). Coarse track counts maps of LRIT-participating ships in 2010-11 were computed for distances greater than 1000 km from coastline and clearly illustrated the large-scale network of main shipping routes and the much lower traffic above 50°N. The low resolution of LRIT data and the limited information on ship identity did not allow a detailed analysis of traffic density per ship type, length class, or other characteristics. Shipping traffic data from various sources collected by the Canadian and US Coast Guards was also mapped for the Canadian West Coast during modelling studies of shipping noise and ship strike risk to whales (Williams and O'Hara 2009, Erbe et al. 2012, Erbe et al. 2014). These general maps were computed using a coarse grid for a single period without presentation of traffic by ship category. The present study uses AIS data, which provide more complete ship identity and high-resolution position data, for building detailed traffic maps per ship category in Canadian waters. This has never been done for shipping in Canadian waters.

The present atlas is a contribution to filling this gap for southeastern Canada by providing maps of AIS-tracked ship traffic during 2013. It documents the present state of the AIS traffic density in time and space, including by ship type, length class, and speed categories. Similar shipping traffic atlases have been published for two other southern Canadian regions: the East Coast (from the St. Lawrence Estuary's marine water limit) and Centre (fresh water St. Lawrence and Great Lakes). These atlases are presented in two additional volumes of the same report series (Simard et al. 2014a, b).

2. MATERIALS AND METHODS

This atlas is based on available AIS information on shipping in Canadian and surrounding waters south of ~55° N, from 1 January to 31 December 2013. Except for fishing vessels, AIS is compulsory by law for all ships of 500 gross tonnage (GT) or more, ships of 300 GT or more engaged on an international voyage and ships of 150 GT or more engaged on an international voyage and carrying more than 12 passengers[1]. Other ships and boats can be equipped with AIS systems on a voluntary basis; these may include fishing vessels and fishing beacons. Other vessels not equipped with an AIS system are not mapped. The source of the raw shipping data and its processing are detailed below.

2.1. AIS data bank

The analyzed data are the AIS streams collected by the DFO-Coast Guard's coastal network of AIS antennas deployed to track and monitor shipping in southern Canadian waters (Fig. 1). This ship monitoring network provides a real-time, continuous stream of AIS ship positions from all southern Canadian waters (< 55° N) that is consolidated on a single server. This flow of binary data was recorded for the whole year in 2013 via a connection to this server. This data stream represents about 600 MB of data per day.

The DFO–Coast Guard's coastal AIS network covers all areas of interest for the atlas, except for offshore areas too far from the coastal AIS antennas. Although ship positions beyond 200 km of the coastline were sometimes collected, the usual maximum AIS communication ranges with coastal antenna are generally smaller (typically < 100 km). Successful AIS communication between ships and coastal antennas also depends on factors affecting radio frequency (RF) communication range, such as proper installation and working of the systems, antenna height and lines of sight, transmission power, and weather conditions. A 100% RF communication range limited to ~ 100 km is more common. An examination of the AIS antenna distribution (Fig. 1) and the computed ship trajectories and traffic density maps indicate that all Canadian waters up to ~ 100 km from the coastline seems to be well covered by the coastal AIS network. Within that range, ship trajectories were continuous and did not end in zones of null traffic. The part of Queen Charlotte Sound farther than 100 km from any antenna is an area where AIS signal reception may become weak (Fig. 1). Interruptions of reception shorter than 3 h were filled in by interpolations (see below). Longer interruptions were not interpolated.

---

[1] http://laws-lois.justice.gc.ca/eng/regulations/sor-2005-134/page-11.html (accessed on 2014-02-16)

Communication with the server was interrupted on occasion. Interruptions usually lasted only a few minutes and were much shorter than 3 h most of the time. These data gaps were also bridged by interpolation (see below). Longer interruptions occurred on 28 days over the year; the daily traffic statistics for these days were computed with the available data that remained. Data were missing for four complete days in October. In these cases, the monthly and annual averages and percentiles were computed based on the number of days for which data existed.

2.2. Data processing

The raw binary AIS data strings were read using a customized software program (in Python language) to extract the data fields shown in Table 1 and convert them into ASCII format. These data were provided chronologically for all ships independent of their location in Canadian waters. The reading and conversion program then sorted the data by ship and stored them in one *.csv ASCII file per day.

Table 1. Data fields of ASCII-txt files extracted from the recorded raw AIS data and used in the computation of the maps.

Data field	Examples	Used
Vessel type	Search and rescue vessel Tanker; no additional information Passenger; all ships of this type Cargo; all ships of this type Pleasure Other type; all ships of this type Not available Tug	√
Time (UTC)	2013-01-14 05:33:41	√
Vessel mmsi no. (Maritime mobile service identity)	316278000	
Navigation status (0= underway using engine, 1= at anchor, 2 .... etc.)	0	
ROT (Rate of turn) (° / min)	0.0	
SOG (speed over ground) (knots)	8.7	
Latitude (°)	46.6270166667	√
Longitude (°)	-53.0057966667	√
COG (course over ground) (°)	211.0	
True heading (°)	207	
Length (m)	193	√
Breadth (m)	27	
Draught (m)	8.1	

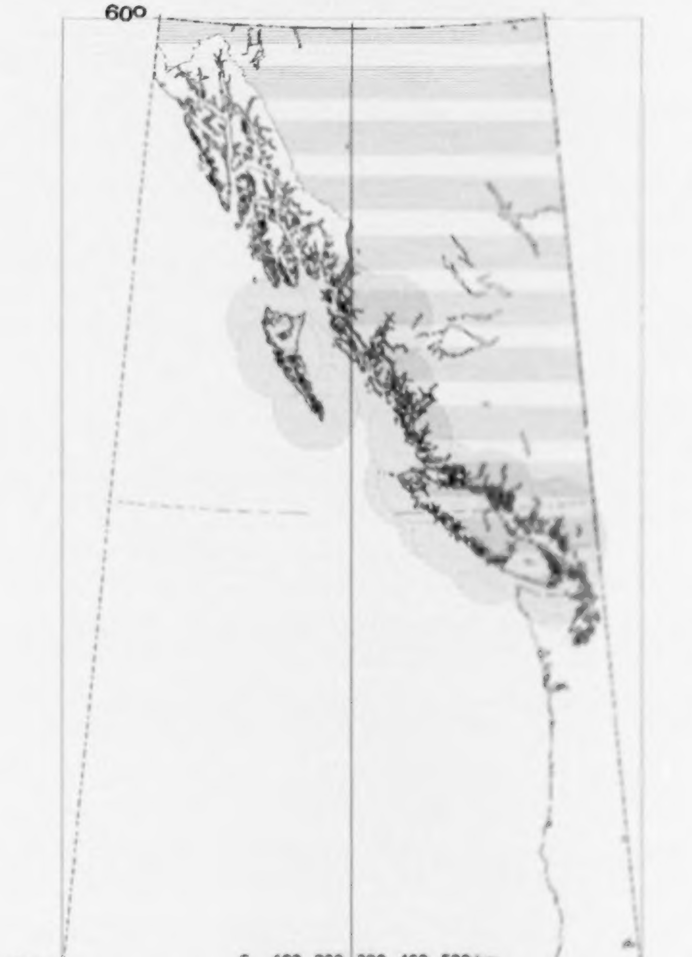


Figure 1. Map of the study area on Canada's West Coast, showing the outer contour of the 1 km^2 mesh Cartesian grid (red rectangle) used for reporting the AIS shipping traffic density as delimited in Table 2, and the DFO-Coast Guard AIS antenna network (crosses), with radii of 100 km (blue circles).

The map coordinates are projected using the parameters of the Lambert conformal conic equal area projection of Table 3. Canada is indicated with hatching.

Table 2. Latitude and longitude limits of the study area used to compute the Cartesian grid.

Grid corner bin center	Latitude N	Longitude W
Bottom left	39.685°	137.953°
Top left	59.740°	141.963°
Bottom right	39.685°	122.047°
Top right	59.740°	118.037°

Table 3. Parameters of the Lambert conformal conic equal-area projection used for the conversion of the positions in latitude and longitude into the Cartesian grid. These parameters conform to WGS 84 datum.

Parameter	**Value**
Standard parallel 1	45.0° N
Standard parallel 2	50.0° N
Origin latitude	48.0° N
Origin longitude	130.0° W
Semimajor earth axis (km)	6378.137
Semiminor earth axis (km)	6356.75231424518
Earth flattening ratio	1/298.257223563

The retained AIS data for the atlas were first checked for errors or incomplete information, such as spurious latitude, longitude, time errors, and interruptions in data streams or absent or erroneous ship-length data. Position and time errors or gaps were corrected by interpolating from adjacent positions in the time-series. A table of the 12,645 different *mmsi* (maritime mobile service identity) numbers retrieved by the DFO–CG AIS network for all regions in 2013 with their corresponding characteristics was then assembled. In cases of multiple entries for single *mmsi* numbers, only the entry containing the most complete information was retained.

A large proportion (42%) of the *mmsi* numbers (for the whole year of 2013 and in all regions) had missing, wrong, or zero-length data. The missing lengths were partially filled by browsing Internet sites that provide ship characteristics for *mmsi* numbers, which allowed us to retrieve 1,203 ship lengths. Lengths were still zero for 4,075 *mmsi* (32% of all *mmsi*). Approximately ~25% the 12,645 *mmsi* numbers did not contribute to the shipping traffic maps because their sailing speed was less than 1 knot, which was below the threshold for inclusion in the analysis (see below).

The AIS-SOG (speed over ground) field was discarded because this field was sometimes missing (SOG code =1023) for some ships and was often contaminated by erroneous values. The SOG used in the atlas was therefore computed from the correct positions using a multi-step filter that removed speeds exceeding 40 knots and smoothed the fast speed changes occurring within less than 1 or 2 min with a moving average of 900 s. Cross-checks with valid AIS-SOG series showed that our estimated SOG was unbiased, properly tracked the vessel speed, and was robust to non-plausible large speed fluctuations.

In AIS communication protocols, positions are not broadcasted at a constant or same rate for all ships. The data transmission pace varies depending on the AIS class (A or B), the ship speed, and the availability of the VHF transmission band. Furthermore, there were periods of variable durations along a ship track from which no positions were available. Therefore, mapping ship traffic with AIS data is not a direct plot of broadcasted AIS positions. The time-position data must first be interpolated on a common time grid before proceeding to the mapping. Hence, before estimating the time spent by ships in a given area, all positions were interpolated to a same time step of 10 s. Positions gaps along ship tracks were filled by interpolation, up to a maximum of 3 h, to account for gaps in reception either resulting from ships that were out of range of AIS coastal antenna or data stream interruptions from the server. Gaps longer than 3 h for the same ship were considered as two different tracks. (See Discussion for unwanted effects introduced by this interpolation).

The 1 × 1 km mesh grid used for reporting the traffic (Fig. 1) was obtained by projecting the latitude and longitude limits of the study area (Table 2) onto a Cartesian grid using a Lambert conformal conic equal-area projection using the parameters given in Table 3.

The metric used to map the AIS traffic density is *daily ship-h per 1 × 1 km grid cell*. One ship spending 0.5 h in a 1 km^2 grid cell in a given day would give 0.5 daily ship-h of traffic. Two ships spending 0.25 h in 1 km^2 grid cell would also give 0.5 daily ship-h of traffic. This metric is computed using only the ships that are underway (i.e., SOG > 1 knot [1.85 km h^{-1}]). This criterion eliminates data from anchored or docked ships as well as AIS data from fixed antennas or beacons, notably fishing AIS beacons, which are included in the analyzed raw AIS data bank.

The atlas maps present yearly and monthly statistics of the traffic metrics by ship category as indicated in Figure 2. For each period (i.e., the whole year and the 12 months individually), 23 traffic maps are computed for the following:

(a) the total traffic from all vessels (the mean and the 5th, 25th, 50th, 75th, and 95th percentiles of the distribution of the daily traffic density per 1 km^2 grid cell);
(b) the mean traffic corresponding to seven vessel types (cargo carriers, tankers, passengers, tugs, fishing, pleasure, and others ships [including ships of unidentified types]);
(c) the mean traffic corresponding to five different ship length classes (< 10 m, 10–50 m, 50–150 m, 150–250 m, and > 250 m);
(d) the total traffic separated into five ship–SOG classes (2–5 knots, 5–10 knots, 10–15 knots, 15–20 knots, > 20 knots).

The mean traffic metrics are computed using:

$$Mean\ traffic_{Cl_{(x,y)}} = \frac{1}{n}\sum_{k=1}^{n} Daily\ traffic_{Cl_{(x,y)}} \qquad (1)$$

where *Cl* is the vessel category, (*x*,*y*) are the coordinates of the 1 km^2 grid cell, and *n* is the number of days corresponding to the period (year or month). The traffic percentile is calculated using:

$$Traffic\ percentile_{T\alpha_{ALL_{(x,y)}}} = Percentile_{T\alpha_{Cl}}(Daily\ traffic_{ALL_{(x,y)}}) \qquad (2)$$

where α is the considered percentile of the daily traffic distribution for the period T (year, month). These percentiles are computed for all vessel traffic only (Fig. 2).

Overall, a total of 299 maps are presented. A common exponential six-colour palette was used for displaying the traffic density for the whole atlas (Table 4). White corresponds to null traffic. The allocation of traffic density to colours follows a geometric series with a doubling ratio. This exponential palette highlights the densest traffic areas while keeping the differences in low traffic densities visible.

For each map, the cumulative histogram of the mapped non-null traffic density per 1 km^2 grid cell is provided in a superimposed bar chart, where each bar corresponds to the traffic density intervals of the map palette (Table 4). The total number of 1 km^2 grid cells containing non-null traffic is also provided below the palette as well as the sum of the daily traffic. These statistics can be used to compare regional traffic among maps. The total traffic density per 1 km^2 grid cell for the map period is the product of the mapped daily traffic values per 1 km^2 grid cell times the number of days. The total traffic is the sum of the daily traffic times the number of days.

Table 4. Colour palette used to display the AIS shipping traffic in the atlas maps.

Traffic (ship-h per 1 km^2 grid cell)	Color	Cumulative histogram traffic density class
No traffic	white	nil
> 0 to 0.0025	dark blue	1
> 0.0025 to 0.005	cyan	2
> 0.005 to 0.01	green	3
> 0.01 to 0.02	yellow	4
> 0.02 to 0.04	orange	5
> 0.04	red	6

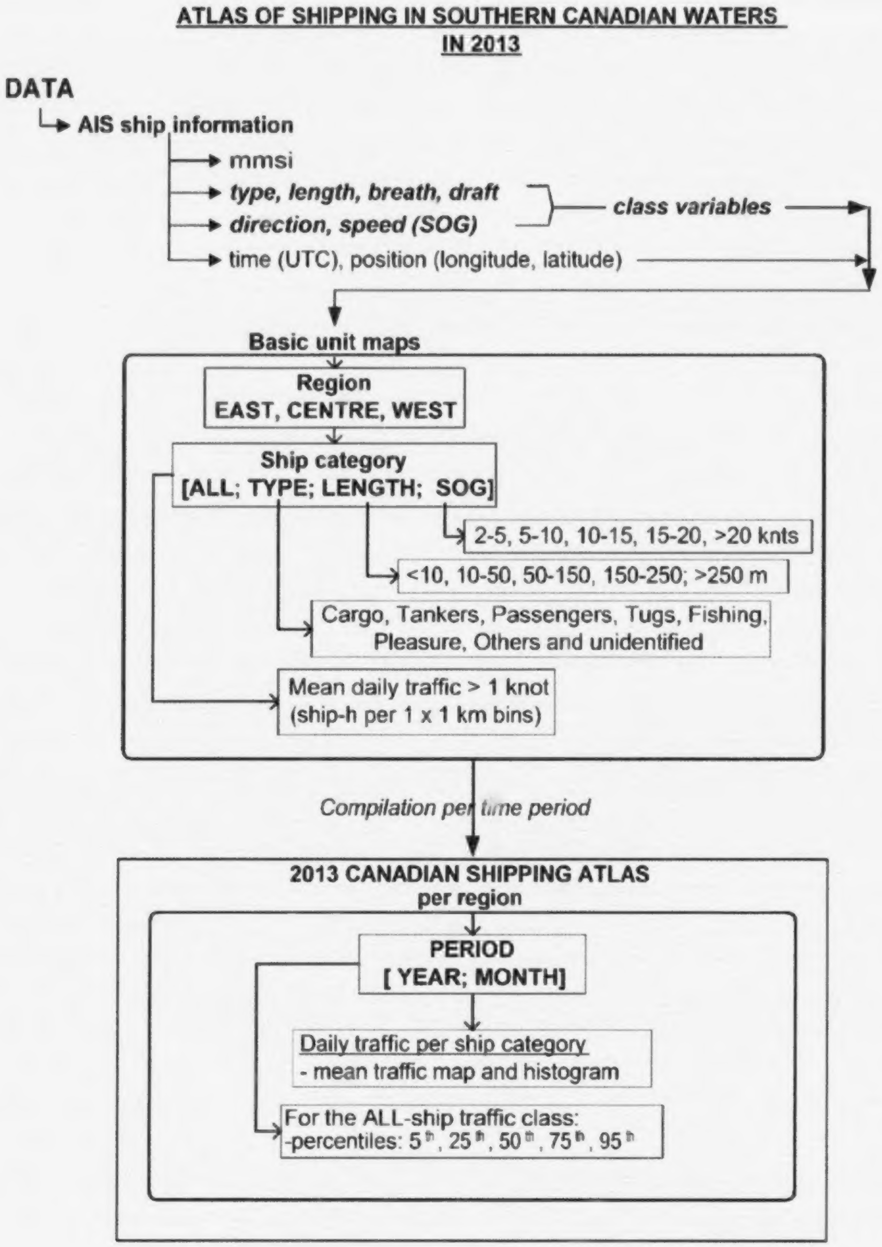

ATLAS OF SHIPPING IN SOUTHERN CANADIAN WATERS IN 2013
DATA
AIS ship information
mmsi
type, length, breath, draft
direction, speed (SOG)
class variables
time (UTC), position (longitude, latitude)
Basic unit maps
Region
EAST, CENTRE, WEST
Ship category
[ALL; TYPE; LENGTH; SOG]
2-5, 5-10, 10-15, 15-20, >20 knts
<10, 10-50, 50-150, 150-250; >250 m
Cargo, Tankers, Passengers, Tugs, Fishing, Pleasure, Others and unidentified
Mean daily traffic > 1 knot
(ship-h per 1 x 1 km bins)
Compilation per time period
2013 CANADIAN SHIPPING ATLAS
per region
PERIOD
[YEAR; MONTH]
Daily traffic per ship category
- mean traffic map and histogram
For the ALL-ship traffic class:
-percentiles: 5th, 25th, 50th, 75th, 95th

Figure 2. Flow diagram of the AIS data processing for computing the various shipping traffic maps of the atlas.

3. RESULTS

The atlas maps are arranged by year and by month and are presented in sections 7 and 8 of this report. In each section, the maps of all ship traffic statistics are presented first, then the maps of the mean traffic per ship length and ship SOG categories. How to properly interpret the traffic percentile maps is indicated in the figure legends and in the Discussion. These total traffic percentile maps are useful for rapidly locating the high traffic density areas. For example, the 5th or 25th traffic percentile maps reveal areas where the traffic is most intense, having been respectively visited at least 95% or 75% of the days during the considered period. Inversely, the null traffic areas on the 95th traffic percentile map indicate low density areas where there was no traffic at least 95% of the days.

4. DISCUSSION

The ensemble of maps presented in this report constitutes the first detailed atlas of shipping traffic for West Coast Canadian waters. The atlas provides a reasonable representation of the present traffic throughout the annual cycle for different ship types, length classes and sailing speeds. The atlas provides high-resolution traffic density maps for a larger shipping traffic fraction than LRIT traffic using a precise traffic-density metric and detailed layers for supporting several marine spatial planning tasks. It offers a reasonable representation of the present traffic throughout the annual cycle for different ship types, length classes, and sailing speeds within at least a 100 km radius of the coastline. However, the user must recognize the limitations of this atlas, especially that only AIS-equipped vessels are considered. Although AIS traffic includes almost all merchant shipping, a fraction of the total traffic is still missing. For instance, although part of the fishing fleet is equipped with AIS, an unknown and spatially variable proportion is not. This is also true for small commercial and recreational fishing boats, as well as purely recreational marine traffic, which are sometimes considerable on the Canadian West Coast because of the accessibility of these waters.

Another limitation of the present atlas is that the information used to separate the ships by type and length class is sometimes erroneous or simply lacking, especially for smaller vessels. Although we invested much time in correcting and completing the received AIS information by consulting ship lists on the Internet, we know that errors are still present and that information is still missing for a number of ships. AIS identification errors are particularly evident in the < 10 m ship traffic maps, while such small vessels unreasonably appear to sail year-round along regular routes or far offshore. As a consequence, the maps of the ship category "other ships and ships of unidentified type" includes traffic that should have contributed to other maps. Similarly, the traffic maps by ship length may contain ships that are not in the right length class and do not include the proportion of ships with unknown lengths. Therefore the reader must use the atlas for the regional picture it presents on shipping traffic and not put too much emphasis on particular outliers.

The 3 h linear interpolation approach we adopted to correct for data interruptions successfully filled the ship-track gaps that would otherwise have been numerous. However, this approach sometimes had the unwanted drawback of positioning ships on land when they were changing course to sail around islands or curved coastlines. One way of mitigating this effect is to superimpose the land over the traffic to mask the tracks located on land. This had the unwanted consequence of masking all near-shore grid cells partially covered by land. We therefore chose to leave these false traffic track lines visible, after erasing by hand the most striking ones.

An implicit assumption of the atlas is that the fraction of the total fleet equipped with AIS did not change over the annual cycle. This is likely, but we cannot confirm it is true. It is also possible that the AIS reception antenna network did not entirely and uniformly cover the whole study area and that some traffic was missed in a few locations, continuously or intermittently for some periods. Such reception gaps would, however, mostly occur > ~100 km offshore. The interpolation approach we used in making the maps has also likely filled most of the embedded reception gaps and bridged time gaps.

For each map, the aerial sum of the 1 km^2 bins where some traffic was encountered is provided. However it is wrong to interpret this value as the area covered by shipping for the considered period, since any given ship's physical footprint is much less than 1 km^2 and ship density varies from bin to bin. This value is given to assist in comparing the relative importance of given types of traffic throughout the annual atlas. It can be used in combination with the corresponding total daily traffic.

The maps of the daily traffic density percentiles reveal different properties of the total shipping traffic than the maps of the single central statistic (i.e., mean) used elsewhere in the atlas. Their interest for marine spatial planning is to provide, for each 1 km^2 bin, how the daily traffic was distributed at a given location within the month or the whole year. For example, if the traffic was constant throughout the period, all traffic percentiles for this location would have a traffic density equal to the mean because of the uniform probability distribution of the traffic. If the traffic was nil half of the days, then the traffic density percentiles < 50% would have a traffic density of zero. The mean would show some traffic at the location, but the absence of traffic for half of the days would go unnoticed. Likewise, if the traffic was very intense on a few days (of the month or year) and nil the other days, then all traffic percentiles but the highest (e.g., 95%) would have a zero traffic density. This would clearly show the highly sporadic nature of the traffic at this location. On the contrary, when the low traffic density percentiles (e.g., 5% or 25%) are not zero at a given location, this location is likely part of a regularly used sea route. Another interest of the traffic density percentile maps is to provide values of the traffic density associated with sea routes and busy traffic hot spots (e.g., daily traffic density in the 75th or 95th percentiles). When considered over the whole map, the series of traffic density percentiles illustrate how the traffic is spatially distributed over the month or year and its density better than mean traffic density, which blurs the information by averaging over the whole month.

5. ACKNOWLEDGMENTS

This work was supported by Fisheries and Oceans Canada. We are grateful to Michel Desparois and Jean-François Coutu for access to the AIS DFO–Coast Guard data. We thank Cédric Gervaise and Bazile Kinda of the Chair Chorus of the Grenoble Institute of Technology for the initial AIS decoding Python code, Jean-Philippe Lapierre for his help in the acquisition and storing of the AIS data stream from the server, and Gilles Fortin for his help with GIS and geographic data. Thanks to Laure Devine for her editorial work and contribution to improve the readability of the report, and to Myriam O and Svein Vagle for reviewing the manuscript.

6. REFERENCES

Bailey, S.A., Chan, F., Ellis, S.M., Bronnenhuber, J.E., Bradie, J.N., and Simard, N. 2012. Risk assessment for ship-mediated introductions of aquatic nonindigenous species to the Great Lakes and freshwater St. Lawrence River. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/104.

Clark, C., Ellison, W.T., Southall, B.L., Hatch, L., Van Parijs, S., Frankel, A.S., and Ponirakis, D. 2009. Acoustic masking in marine ecosystems: intuitions, analysis, and implication. Mar. Ecol. Prog. Ser. 395: 201-222.

DiBacco, C., Humphrey, D.B., Nasmith, L.E., and Levings, C.D. 2012. Ballast water transport of non-indigenous zooplankton to Canadian ports. ICES J. Mar. Sci. 69(3): 483-491.

Erbe, C., MacGillivray, A., and Williams, R. 2012. Mapping cumulative noise from shipping to inform marine spatial planning. J. Acoust. Soc. Am. 132(5): EL423-EL428.

Erbe, C., Williams, R., Sandilands, D., and Ashe, E. 2014. Identifying modeled ship noise hotspots for marine mammals of Canada's Pacific region. PLOS ONE 9(3): e89820.

Gervaise, C., Simard, Y., Roy, N., Kinda, B., and Menard, N. 2012. Shipping noise in whale habitat: characteristics, sources, budget, and impact on belugas in Saguenay - St. Lawrence Marine Park hub. J. Acoust.Soc. Am. 132: 76-89.

Greig, L., and Abraham, D. 2014. National shipping pathways of effects models. DFO Can. Sci. Adv. Sec. Res. Doc. in press.

Koropatnick, T., Johnston, S.K., Coffen-Smout, S., Macnab, P., and Szeto, A. 2012. Development and applications of vessel traffic maps based on long range identification tracking (LRIT) data in Atlantic Canada. Can. Tech. Rep. Fish. Aquat. Sci. 2966.

Simard, Y., Roy, N., and Gervaise, C. 2006. Shipping noise and whales: World tallest ocean liner vs largest animal on earth. *In* Proceedings of OCEANS'06 MTS/IEEE, Boston, 18-21 Sept. 2006, IEEE, Piscataway, NJ, pp. 1-6. DOI: 10.1109/OCEANS.2006.307053

Simard, Y., Lepage, R., and Gervaise, C. 2010. Anthropogenic sound exposure of marine mammals from seaways: Estimates for lower St. Lawrence Seaway, eastern Canada. Appl. Acoust. 71: 1093-1098.

Simard, Y., Roy, N., Giard, S., and Yayla, M. 2014a. Canadian year-round shipping traffic atlas for 2013: Volume 1, East Coast marine waters. Can. Tech. Rep. Fish. Aquat. Sci. 3091(Vol.1)E.

Simard, Y., Roy, N., Giard, S., and Yayla, M. 2014b. Canadian year-round shipping traffic atlas for 2013: Volume 2, Centre: Great Lakes and upper St. Lawrence. Can. Tech. Rep. Fish. Aquat. Sci. 3091(Vol.2)E.

UNCTAD. 2013. Review of maritime transport no. E.12.II.D.17. United Nations, Geneva. http://unctad.org/en/PublicationsLibrary/rmt2013_en.pdf.

van der Hoop, J.M., Vanderlaan, A.S.M., and Taggart, C.T. 2012. Absolute probability estimates of lethal vessel strikes to North Atlantic right whales in Roseway Basin, Scotian Shelf. Ecol. Appl. 22(7): 2021-2033.

Williams, R., and O'Hara, P. 2009. Modelling ship strike risk to fin, humpback and killer whales in British Columbia, Canada. J. Cet. Res. Manage. 11(1): 1-8.

7. YEARLY TRAFFIC MAPS

All AIS traffic

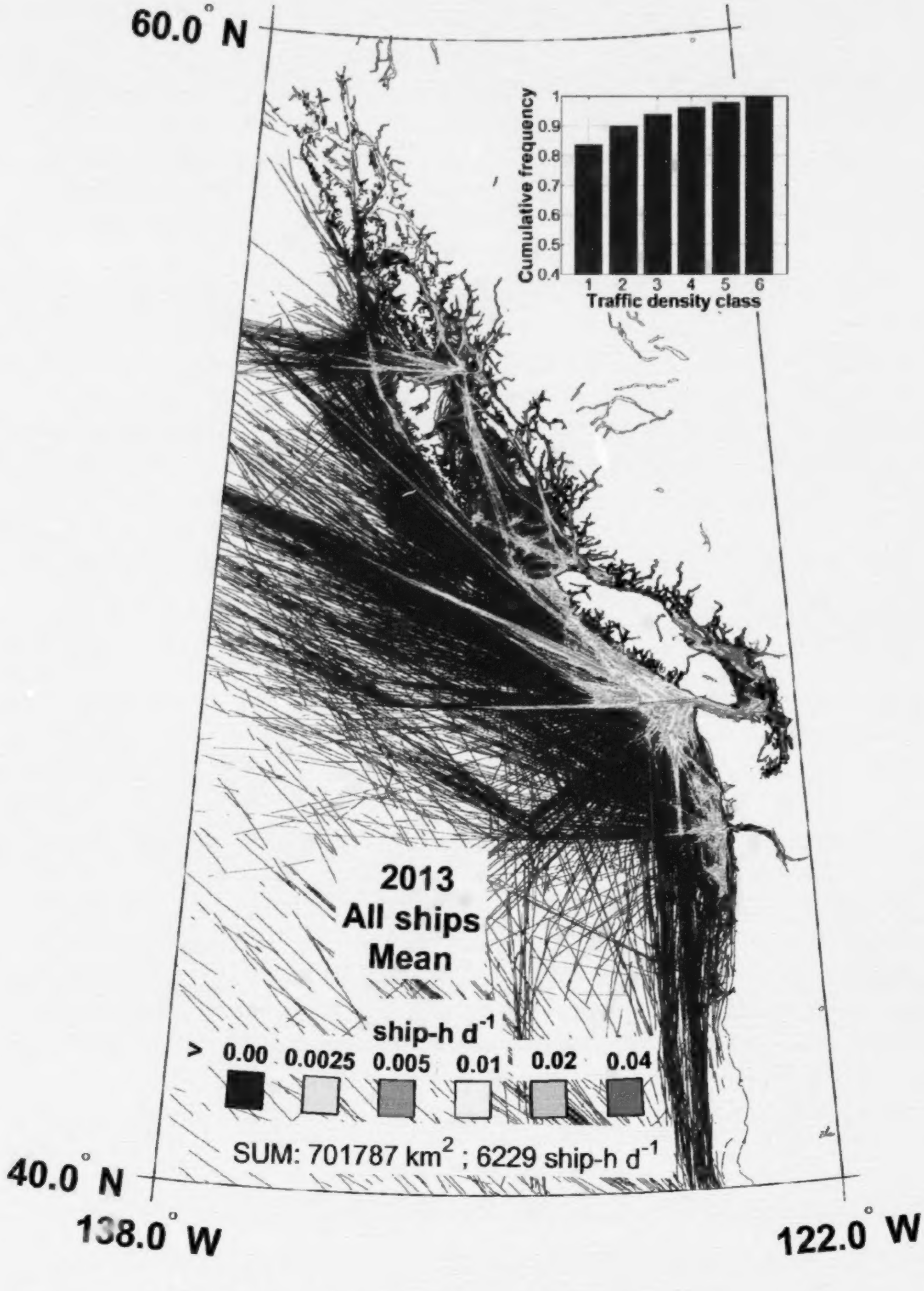

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
All ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 701787 km^2 ; 6229 ship-h d^{-1}

Figure 3. Map of all AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

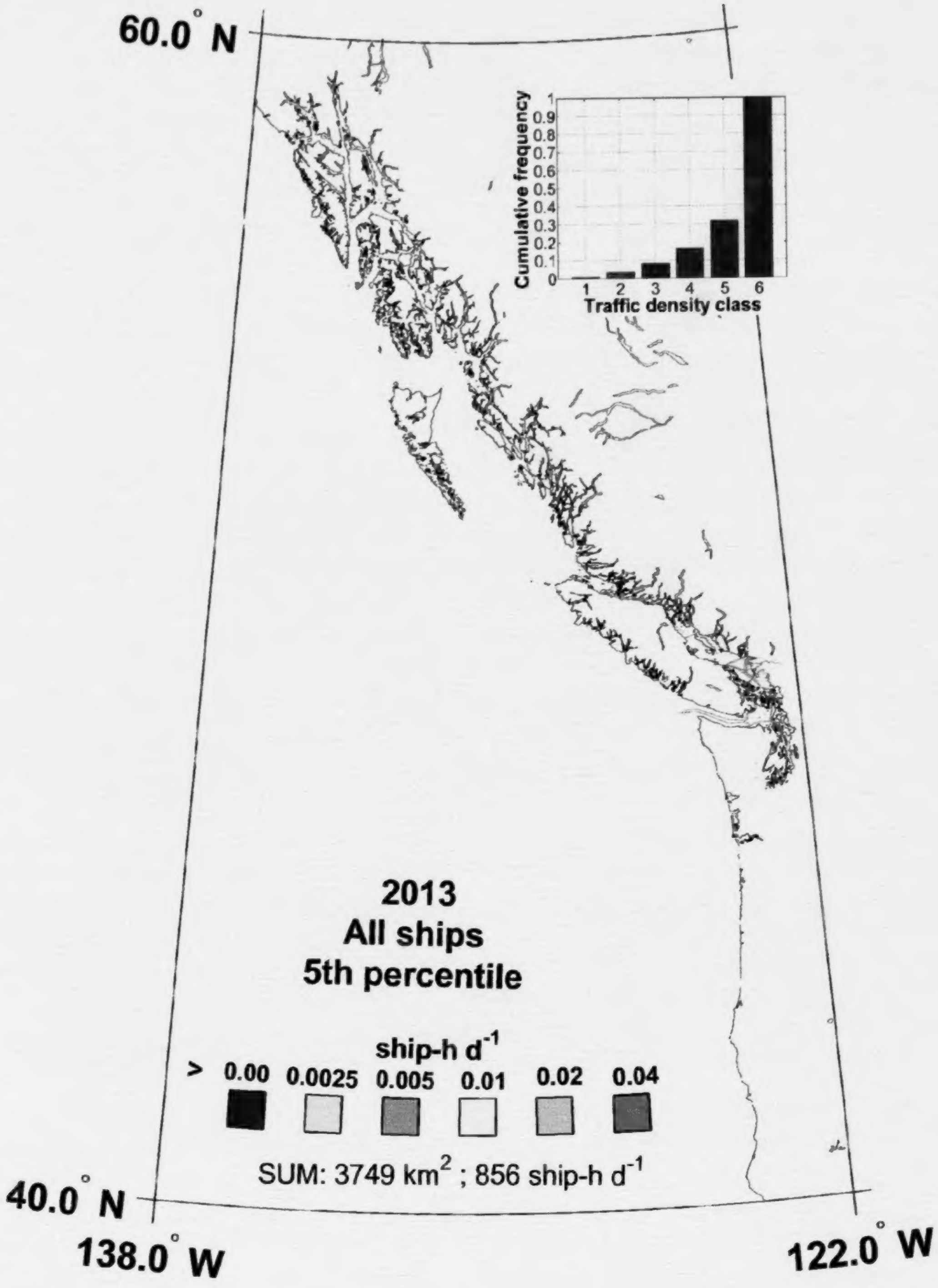

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
Traffic density class
2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 3749 km^2 ; 856 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 4. Map of the 5th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

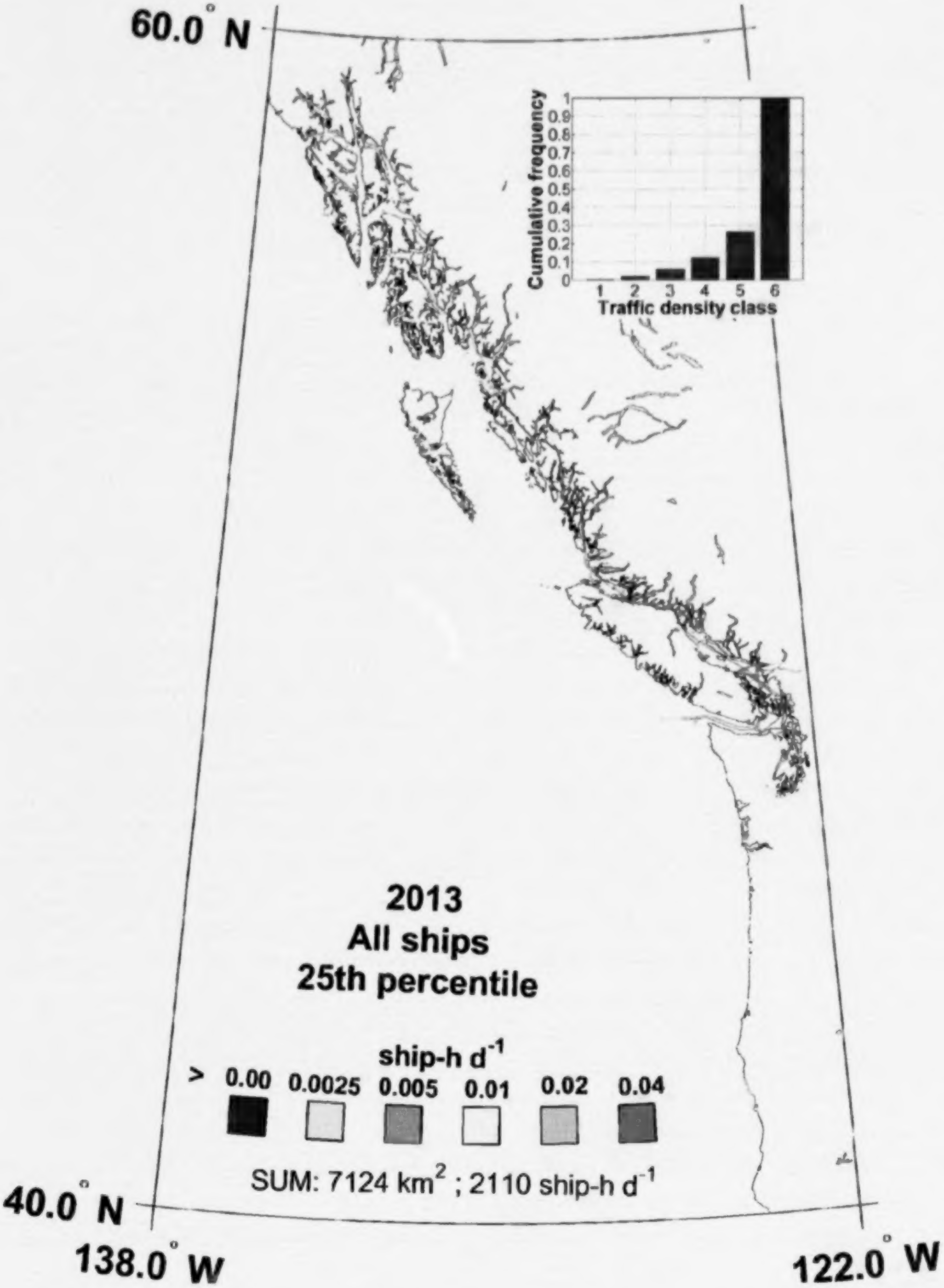

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7124 km^2 ; 2110 ship-h d^{-1}

Figure 5. Map of the 25th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

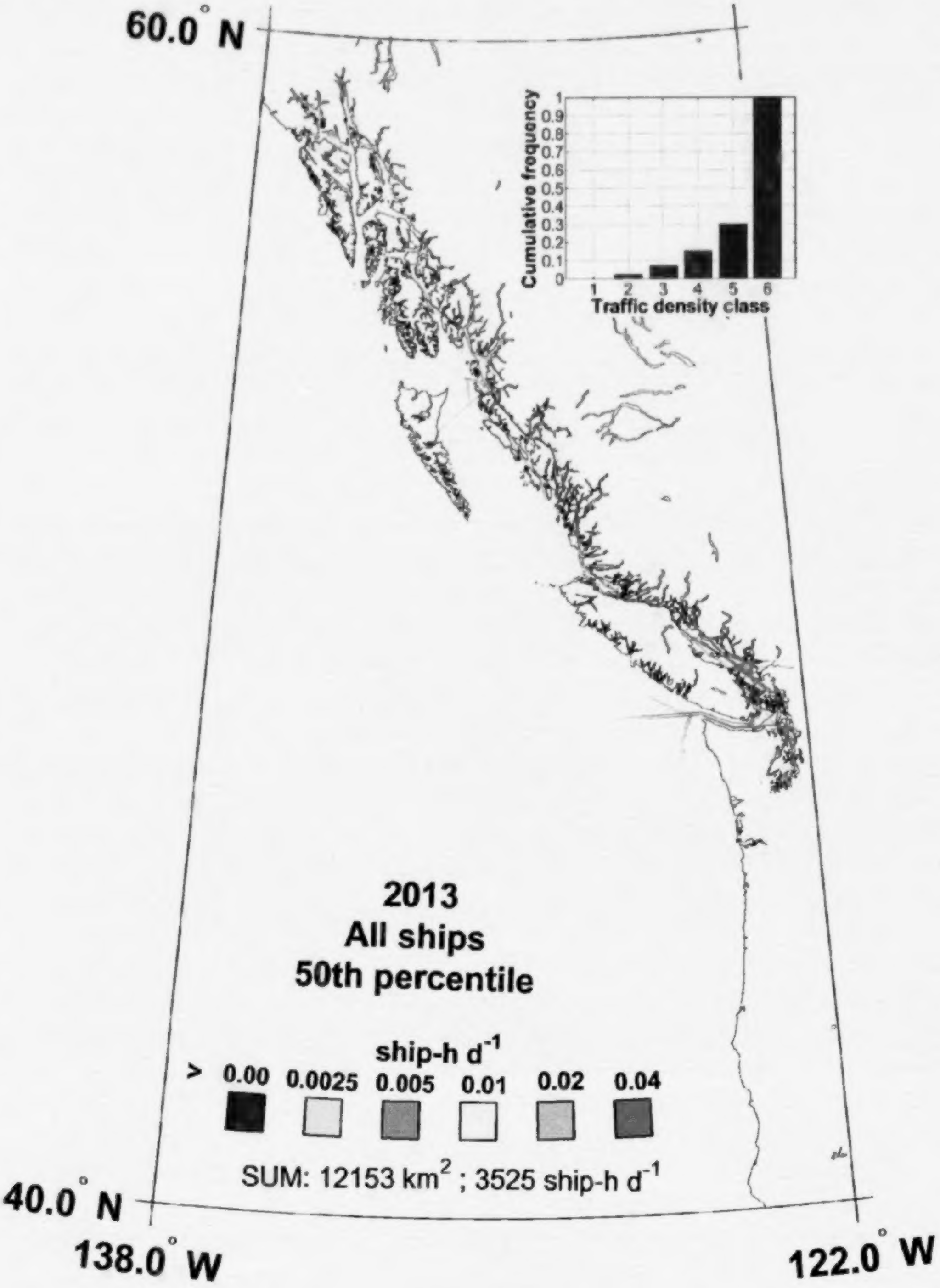

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
2013
All ships
50th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 12153 km2 ; 3525 ship-h d-1

Figure 6. Map of the 50th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

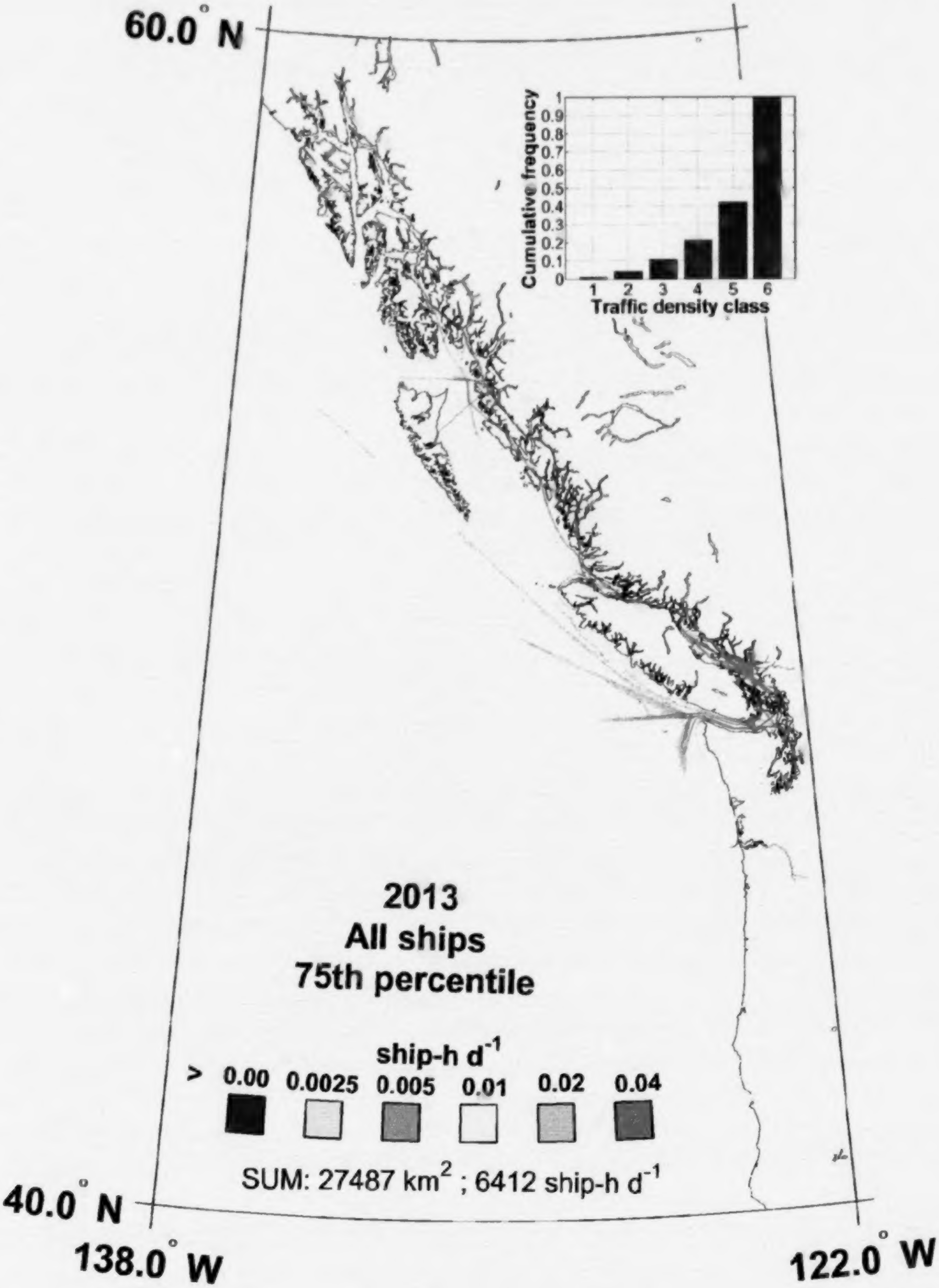

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
2013
All ships
75th percentile
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 27487 km² ; 6412 ship-h d⁻¹

Figure 7. Map of the 75th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

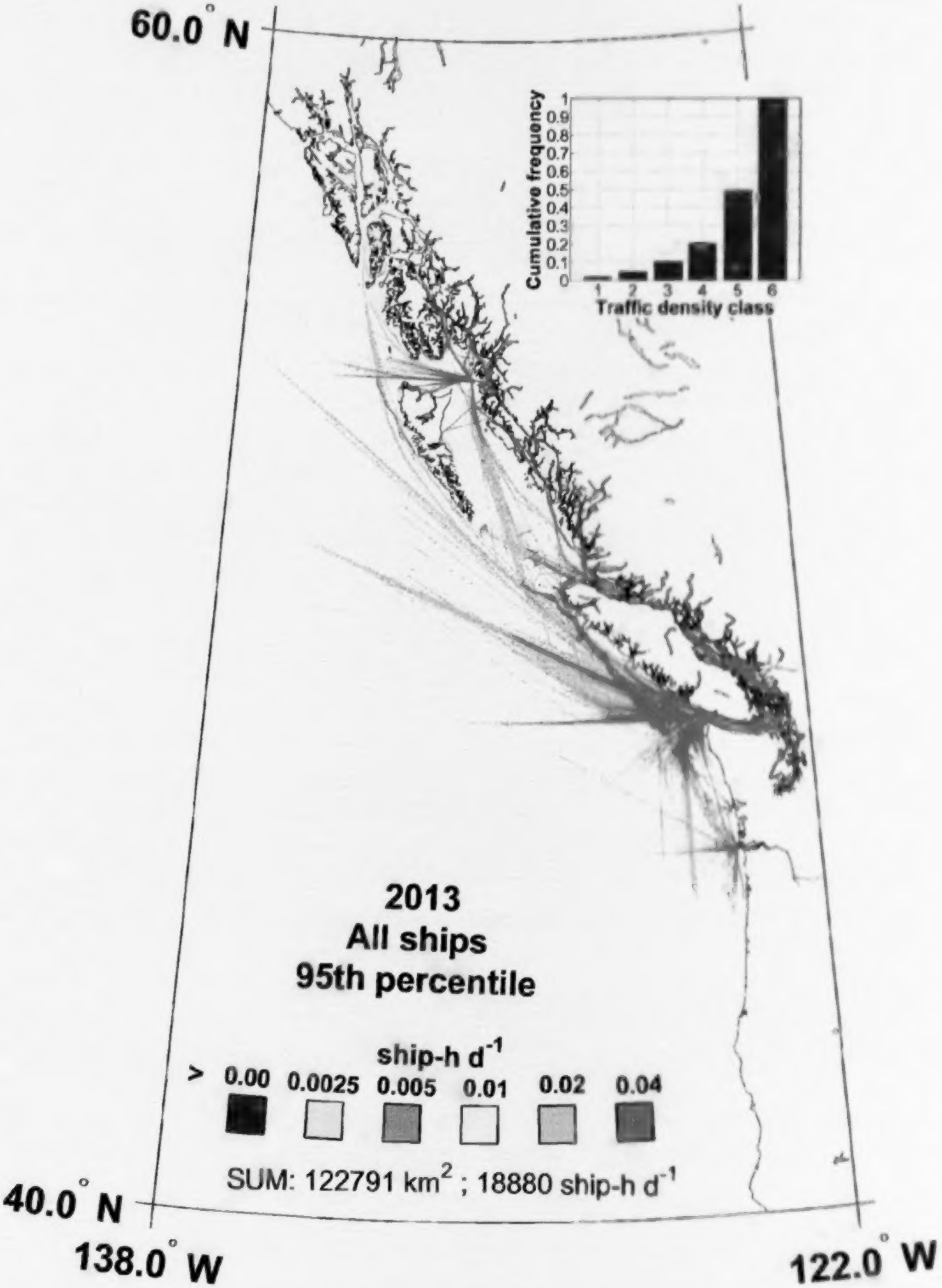

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
2013
All ships
95th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 122791 km^2 ; 18880 ship-h d^{-1}

Figure 8. Map of the 95th percentile of the daily AIS traffic density of all ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

AIS traffic by ship types

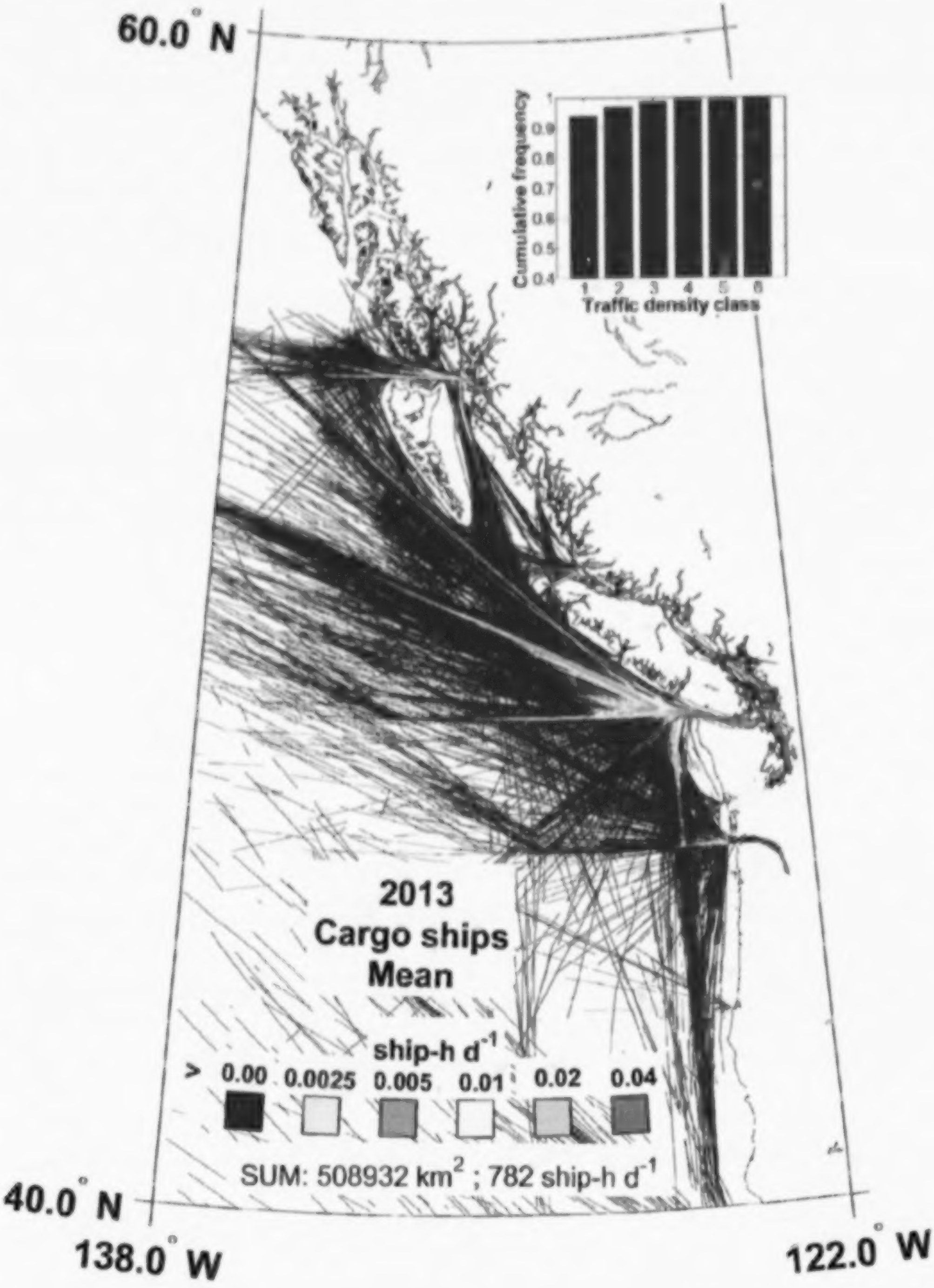

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 508932 km^2 ; 782 ship-h d^{-1}

Figure 9. Map of AIS mean traffic density of cargo-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

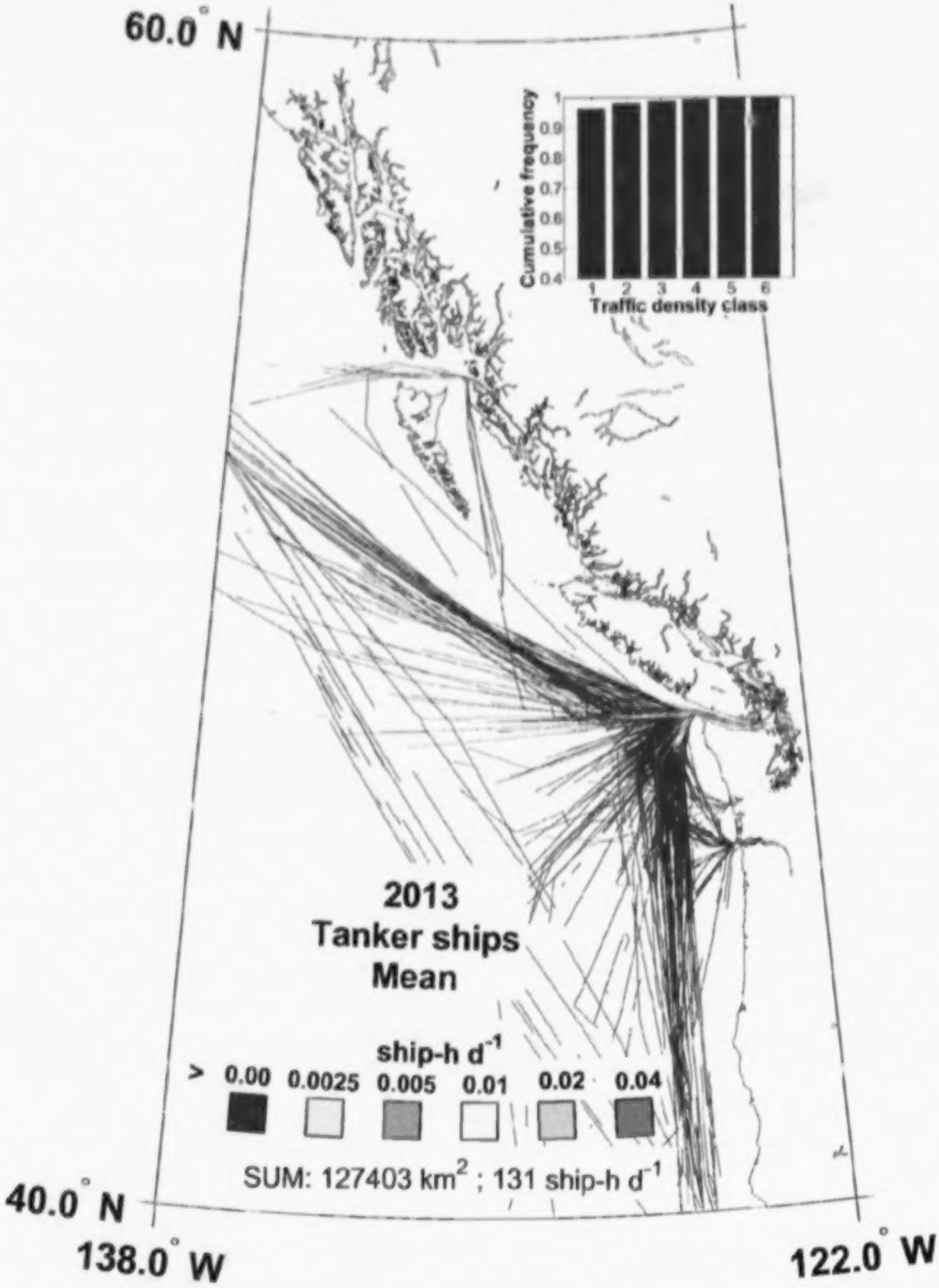

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
Tanker ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 127403 km2 ; 131 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 10. Map of AIS mean traffic density of tanker-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

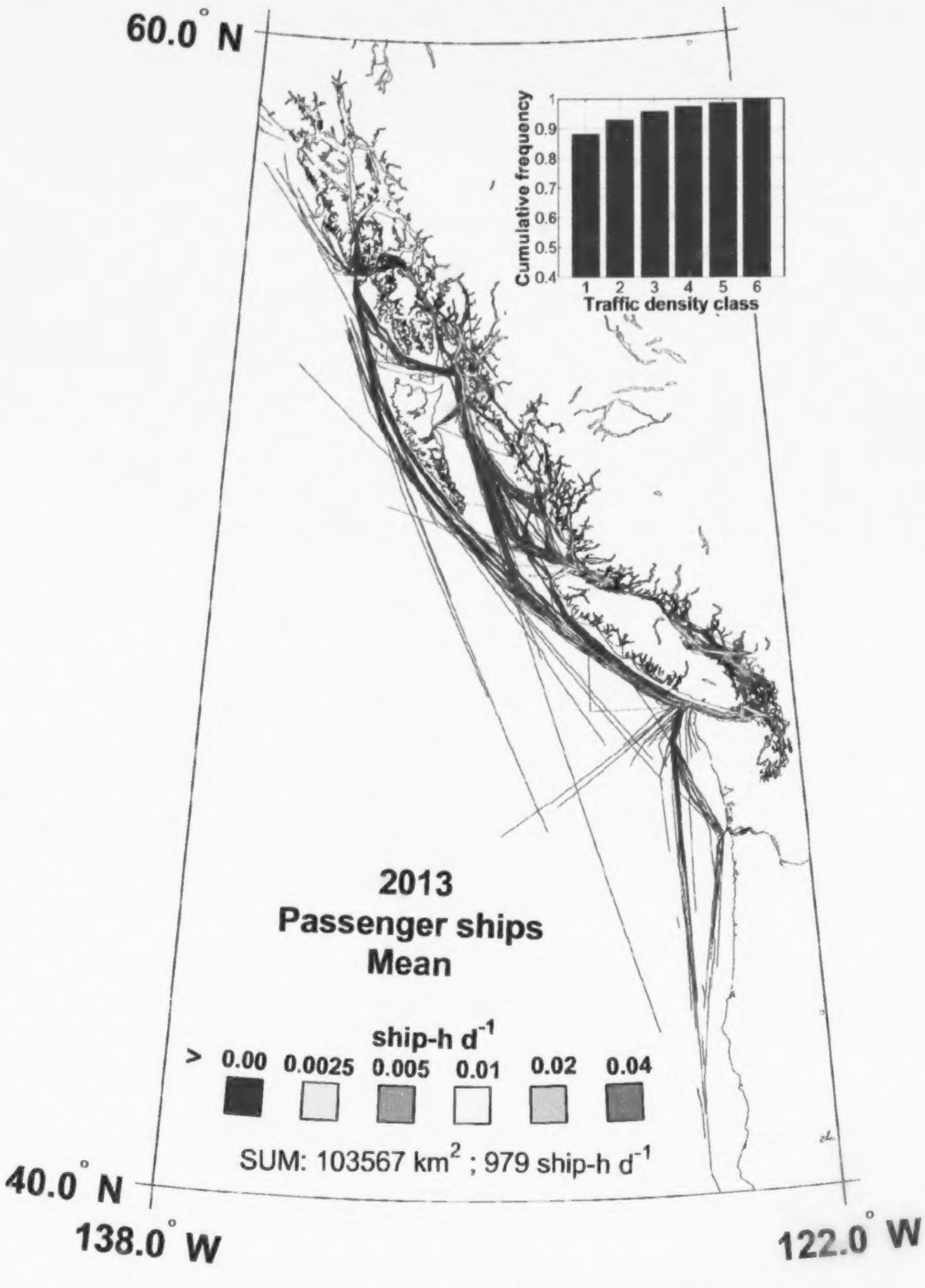

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 103567 km^2 ; 979 ship-h d^{-1}

Figure 11. Map of AIS mean traffic density of passenger-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

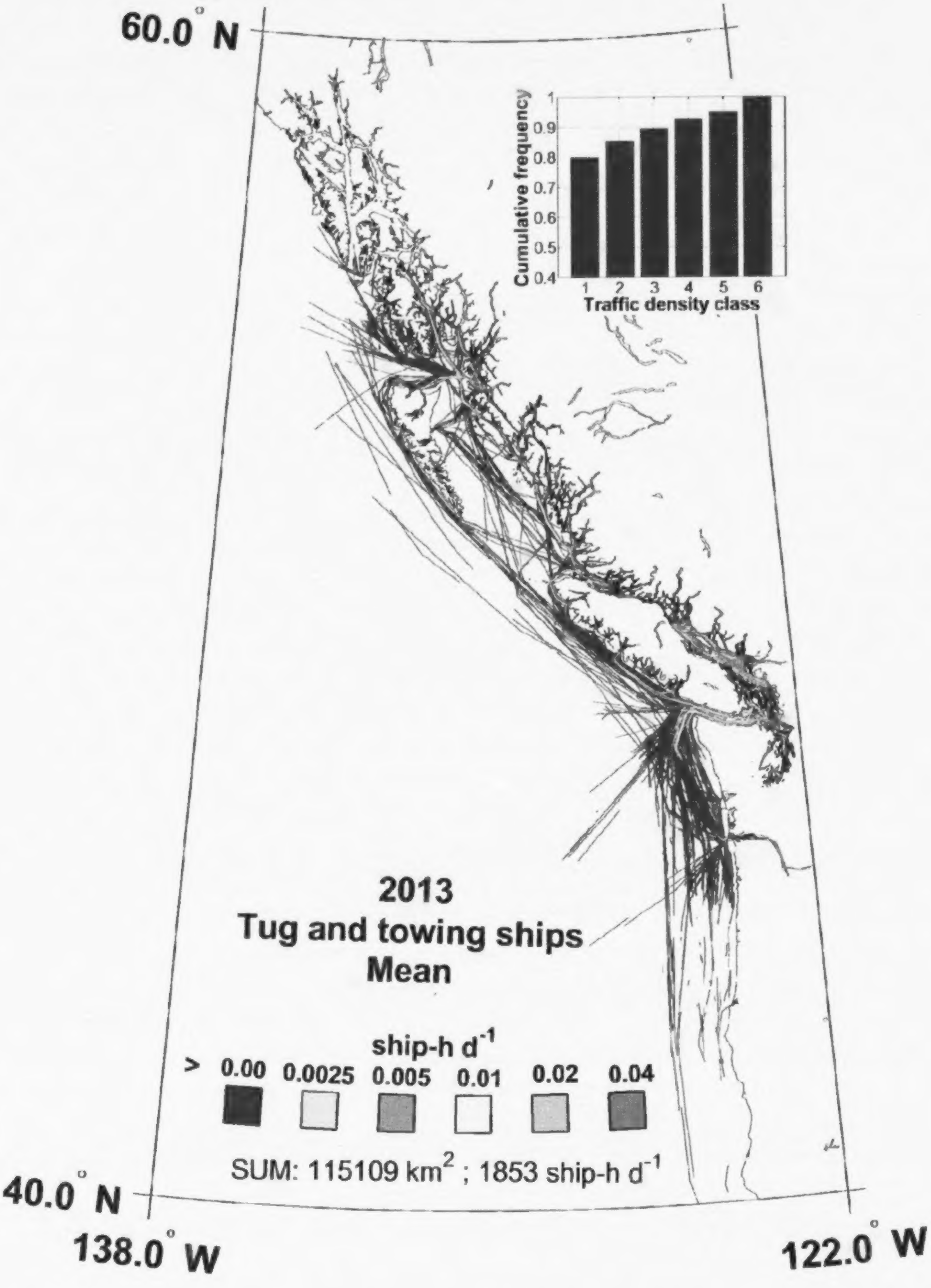

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
Tug and towing ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 115109 km² ; 1853 ship-h d⁻¹

Figure 12. Map of AIS mean traffic density of tug and towing -type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

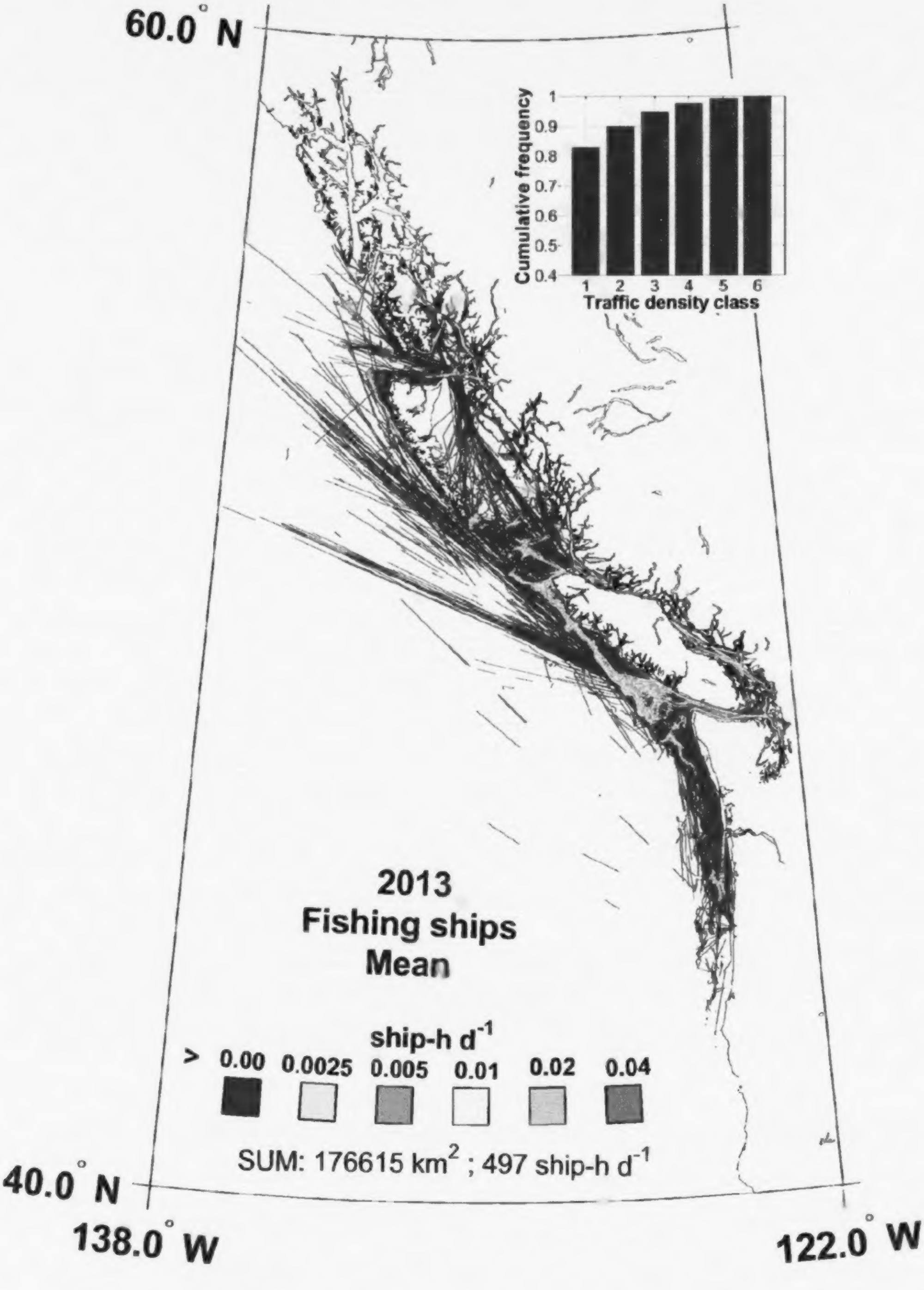

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 176615 km^2 ; 497 ship-h d^{-1}

Figure 13. Map of AIS mean traffic density of fishing-type ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

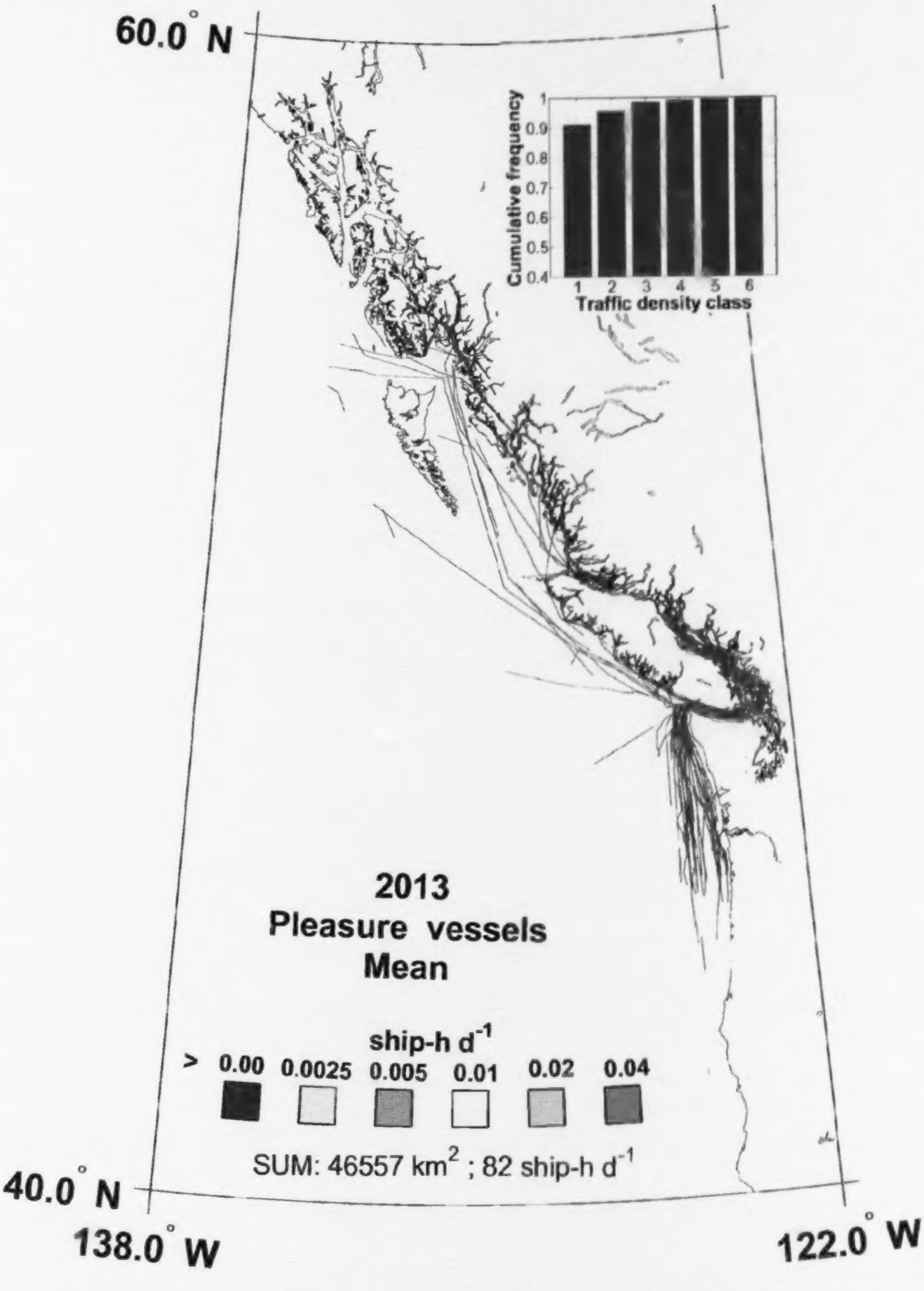

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 46557 km^2 ; 82 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 14. Map of AIS mean traffic density of pleasure-type vessels in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

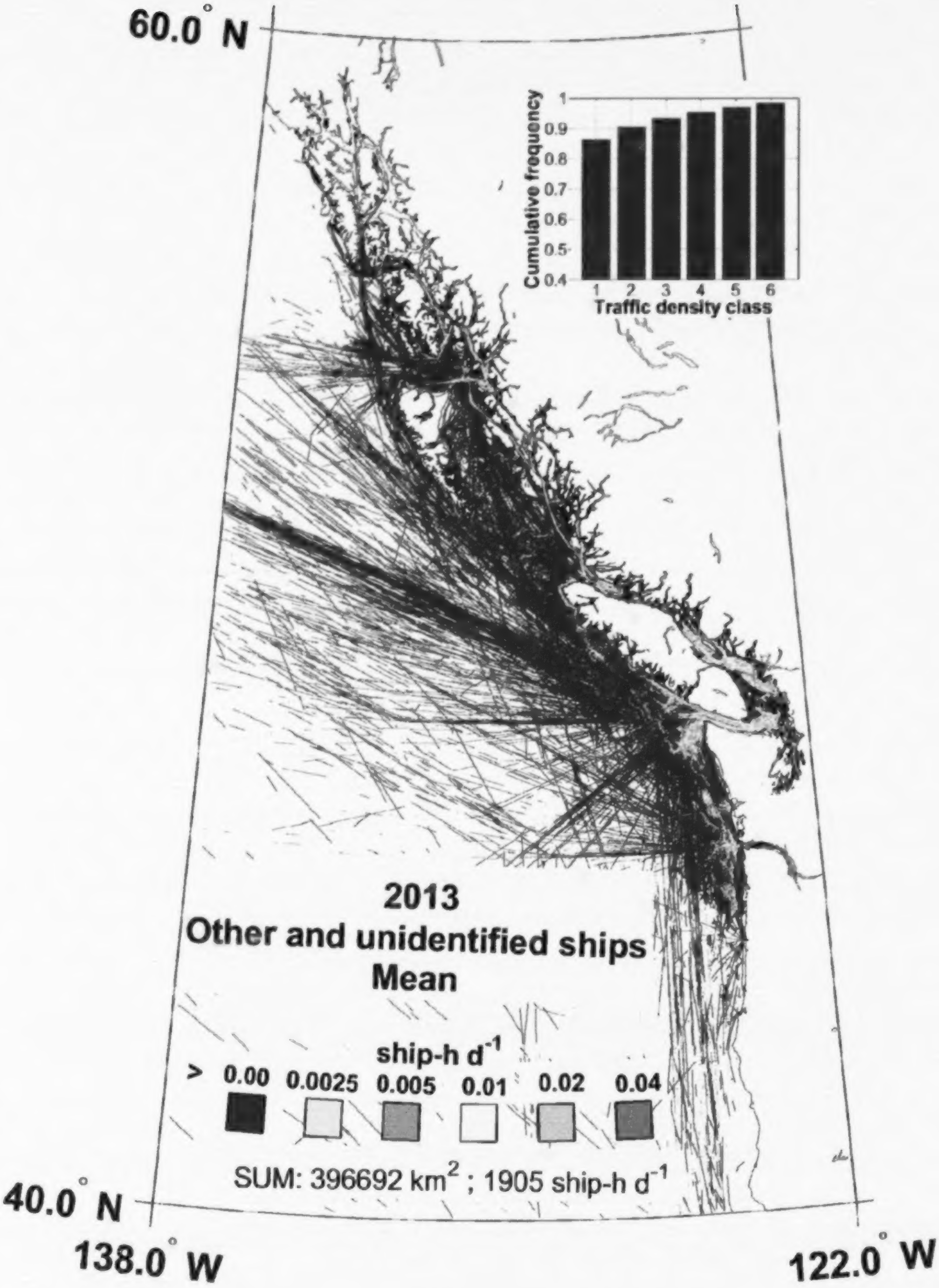

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 396692 km^2 ; 1905 ship-h d^{-1}

Figure 15. Map of AIS mean traffic density of other type of ships and ships of unidentified type in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

AIS traffic by ship length classes

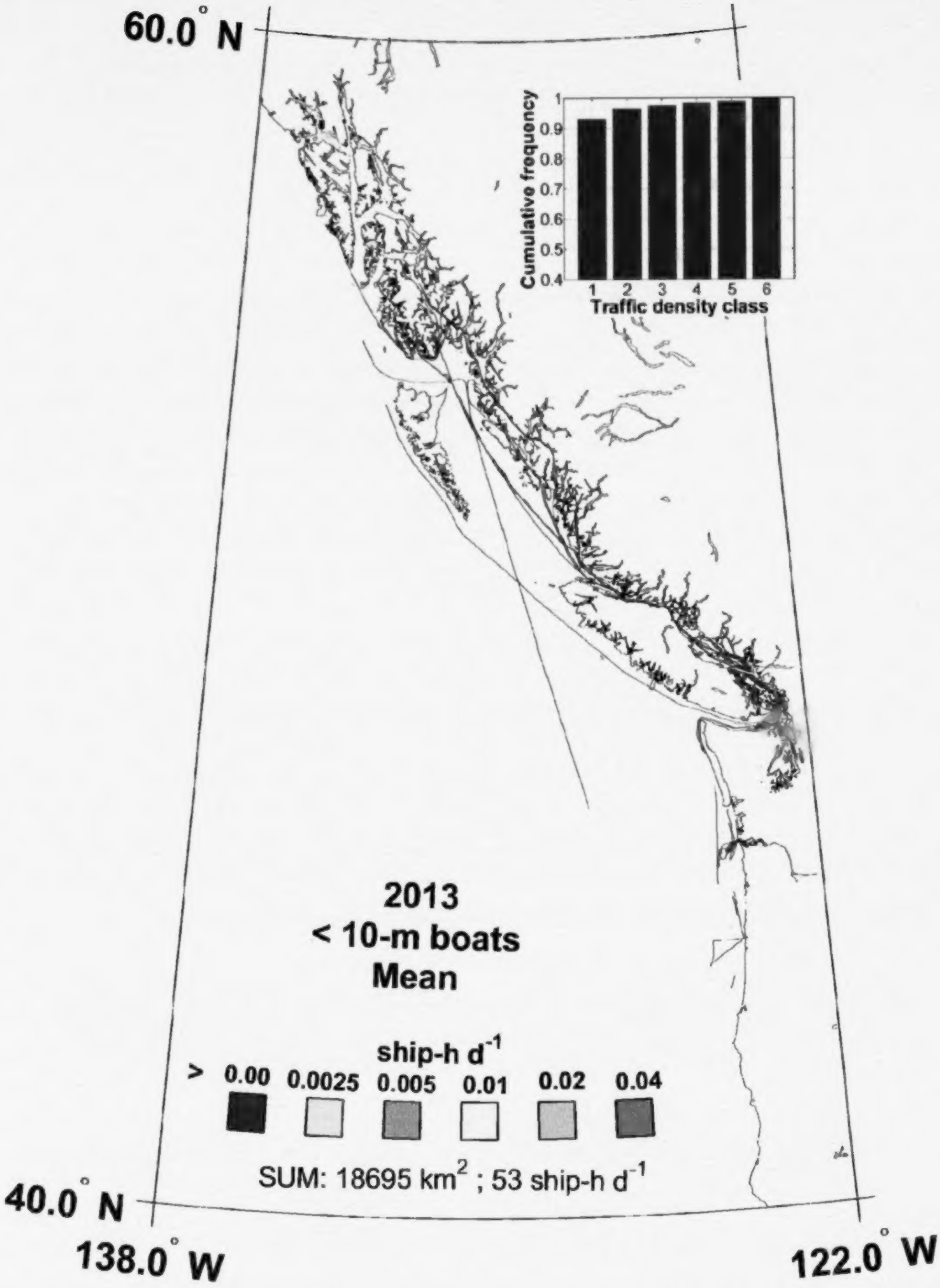

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 18695 km^{2} ; 53 ship-h d^{-1}

Figure 16. Map of AIS mean traffic density of ships with lengths < 10 min 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

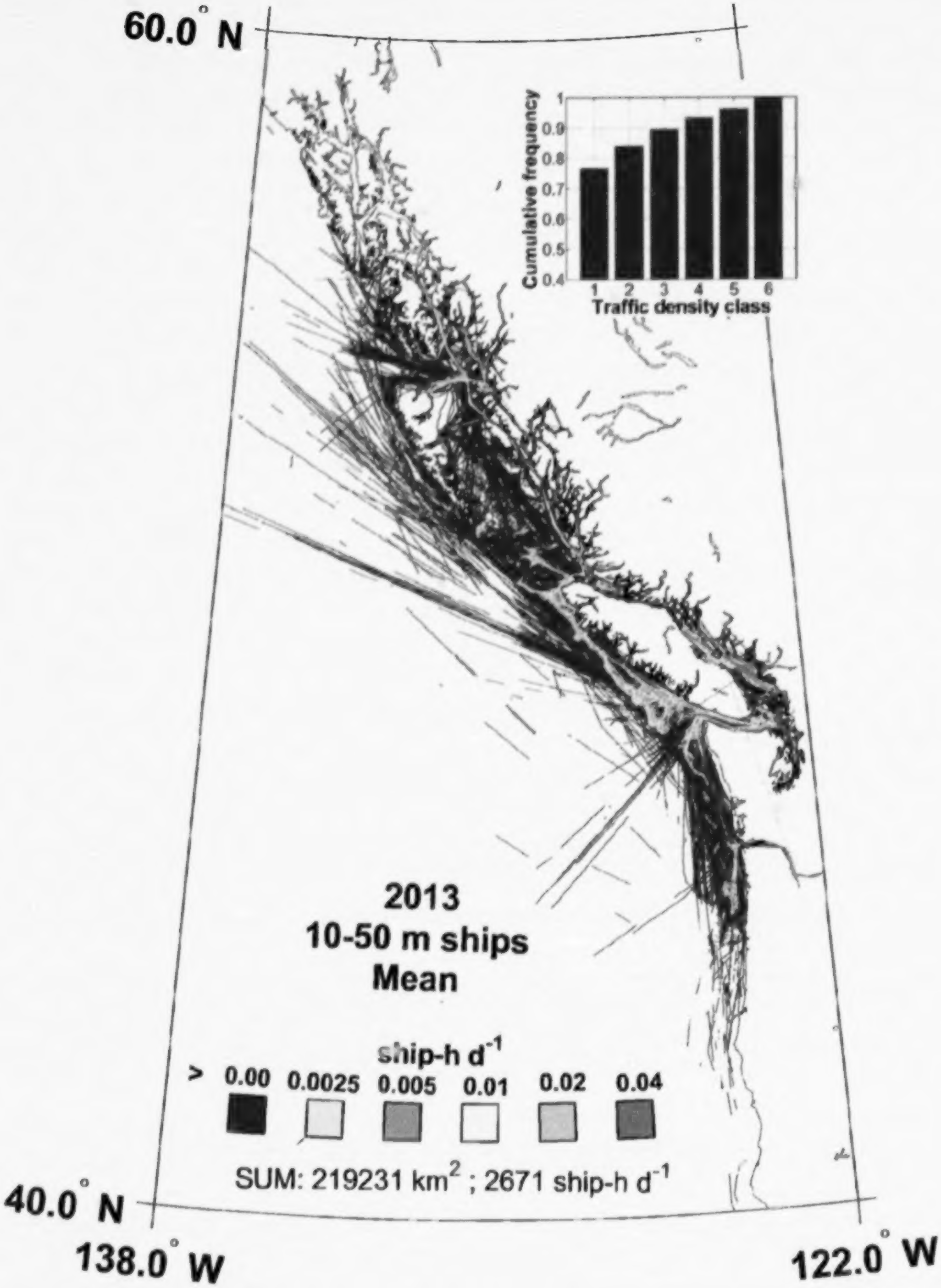

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
2013
10-50 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 219231 km^2 ; 2671 ship-h d^{-1}

Figure 17. Map of AIS mean traffic density of 10 to 50 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

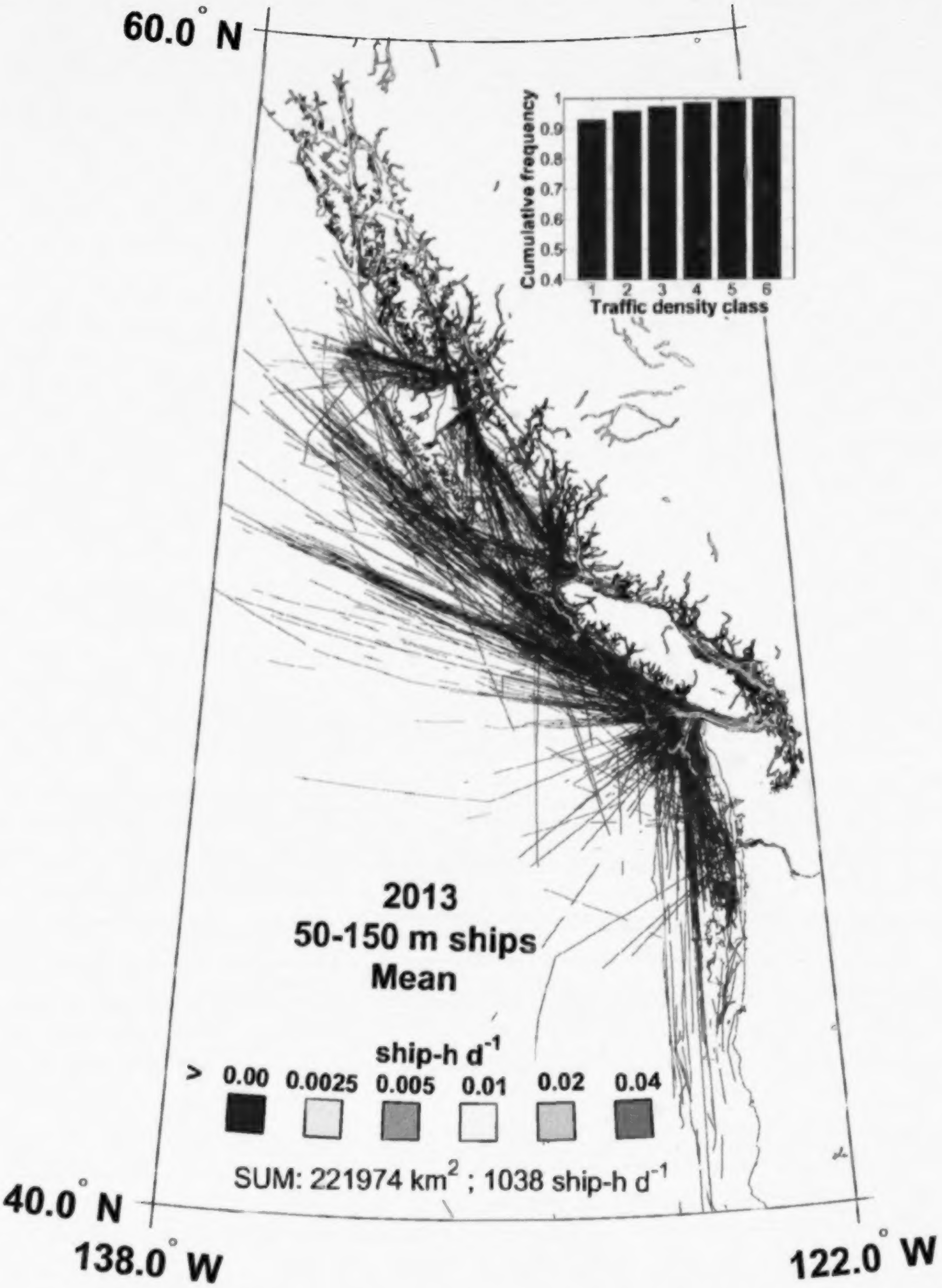

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
50-150 m ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 221974 km2 ; 1038 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 18. Map of AIS mean traffic density of 50 to 150 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

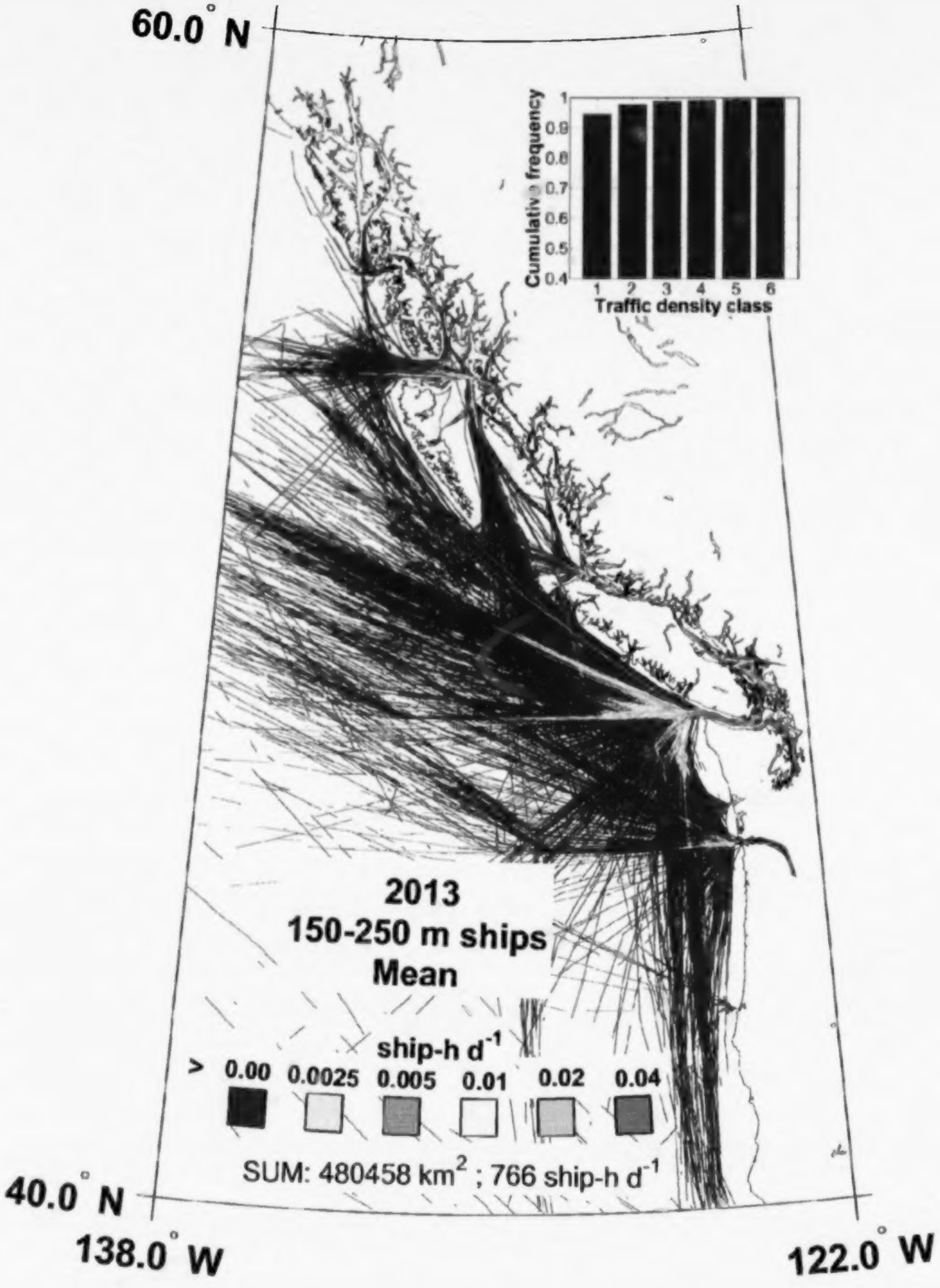
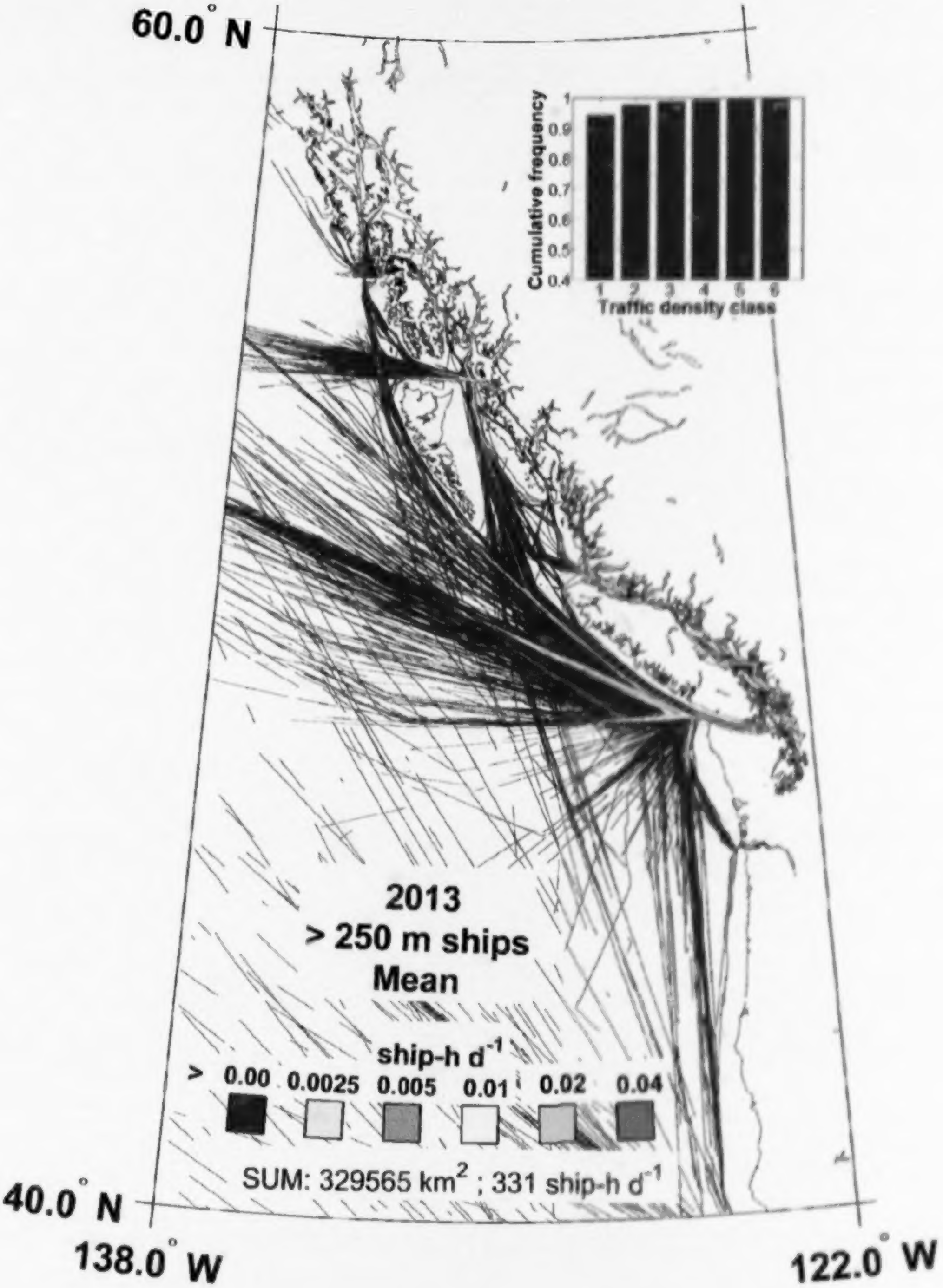

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 480458 km^2 ; 766 ship-h d^{-1}

Figure 19. Map of AIS mean traffic density of 150 to 250 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).



60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 329565 km^2 ; 331 ship-h d^{-1}

Figure 20. Map of AIS mean traffic density of > 250 m ships in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

AIS traffic by speed categories

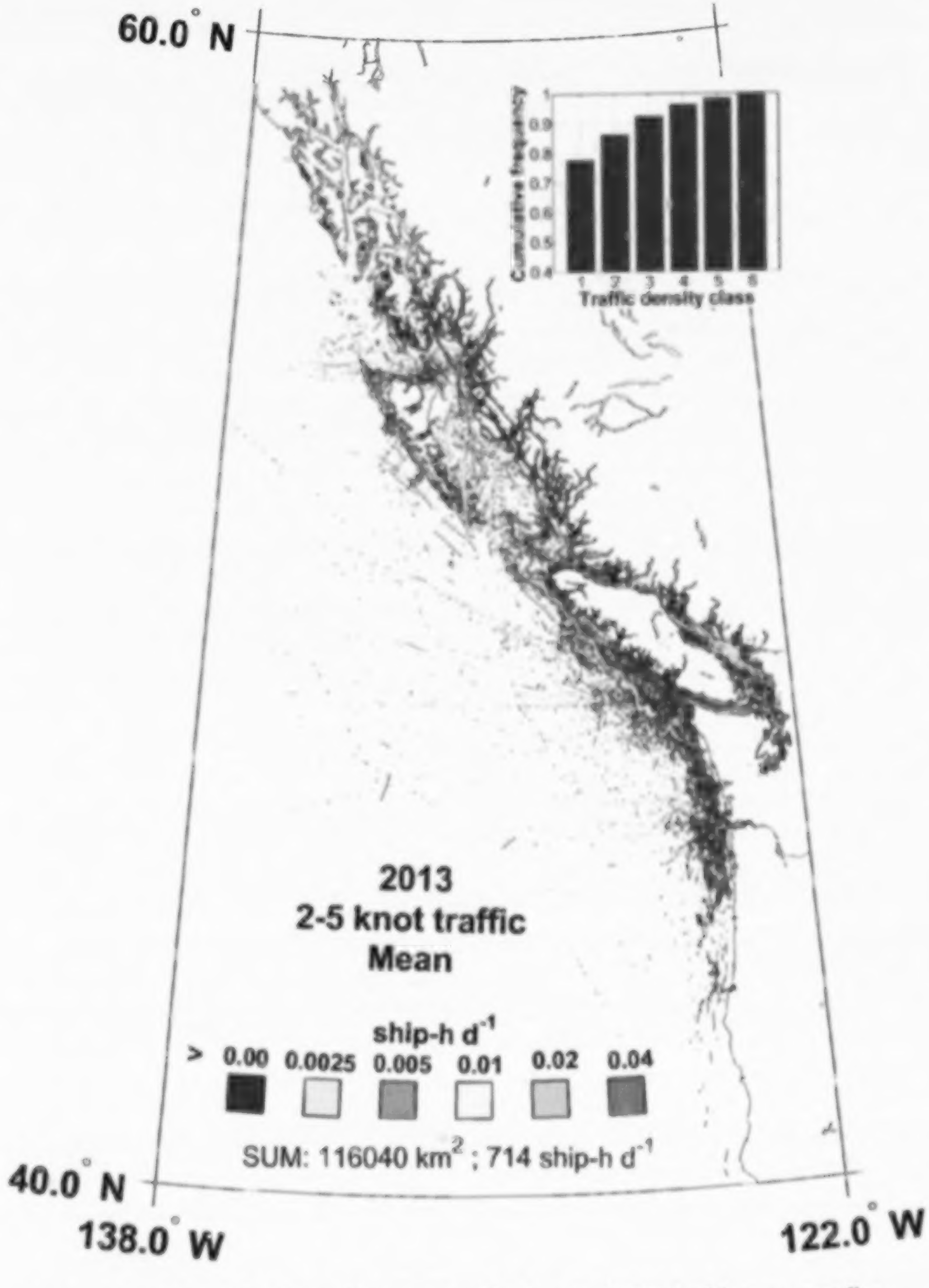

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
2013
2-5 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 116040 km² ; 714 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 21. Map of 2–5 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

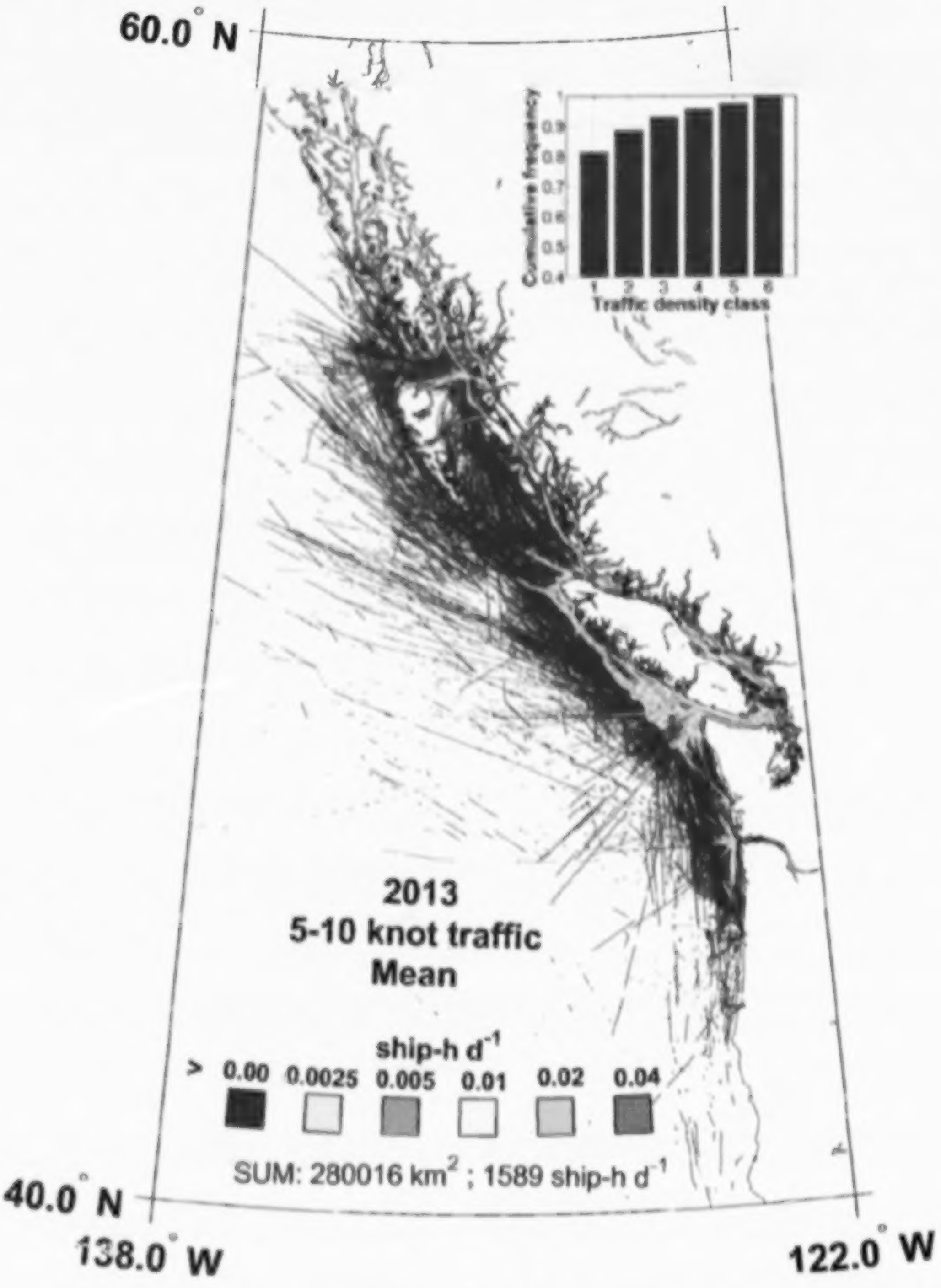

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 280016 km^2 ; 1589 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 22. Map of 5–10 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

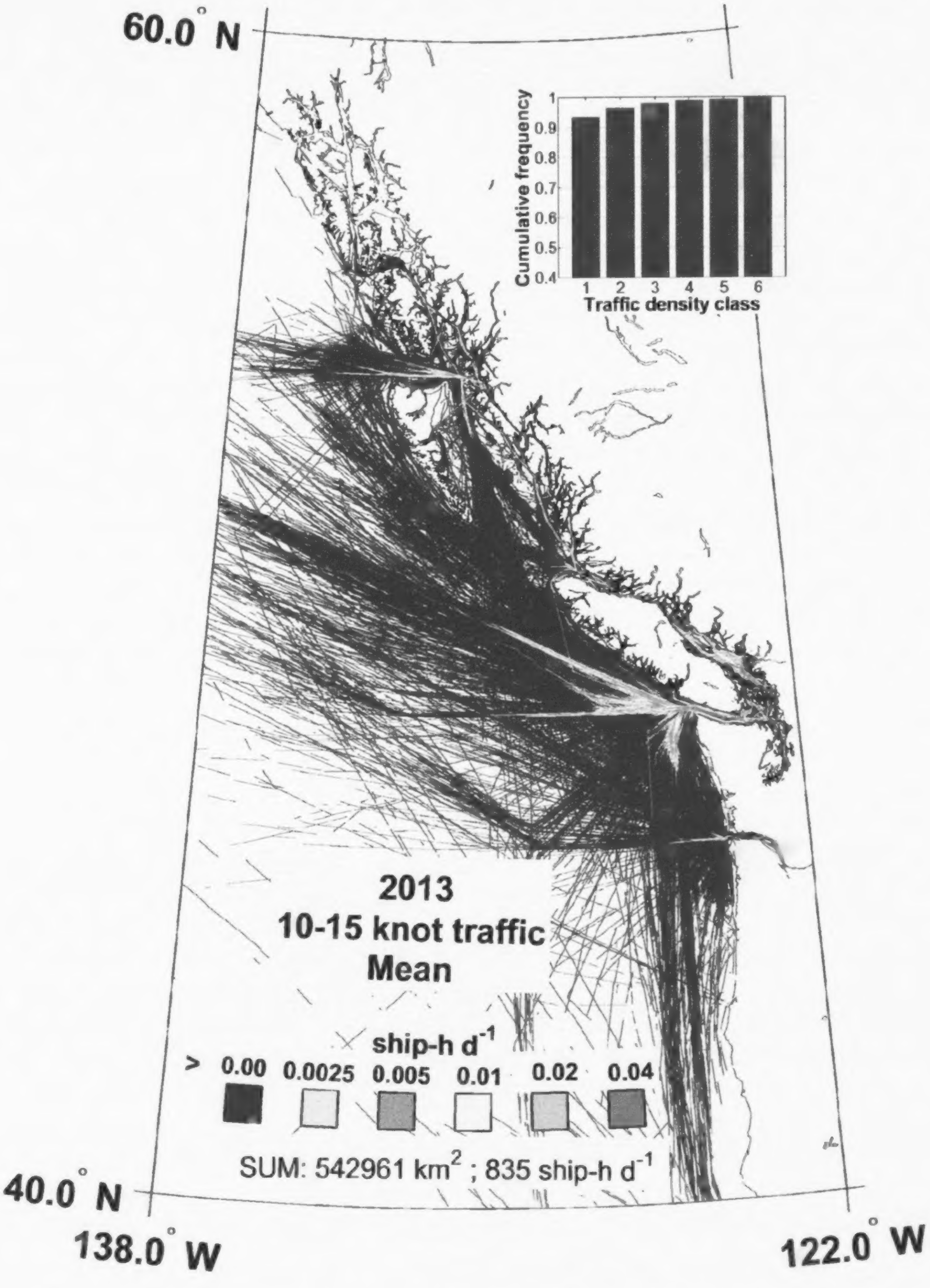

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 542961 km^2 ; 835 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 23. Map of 10–15 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

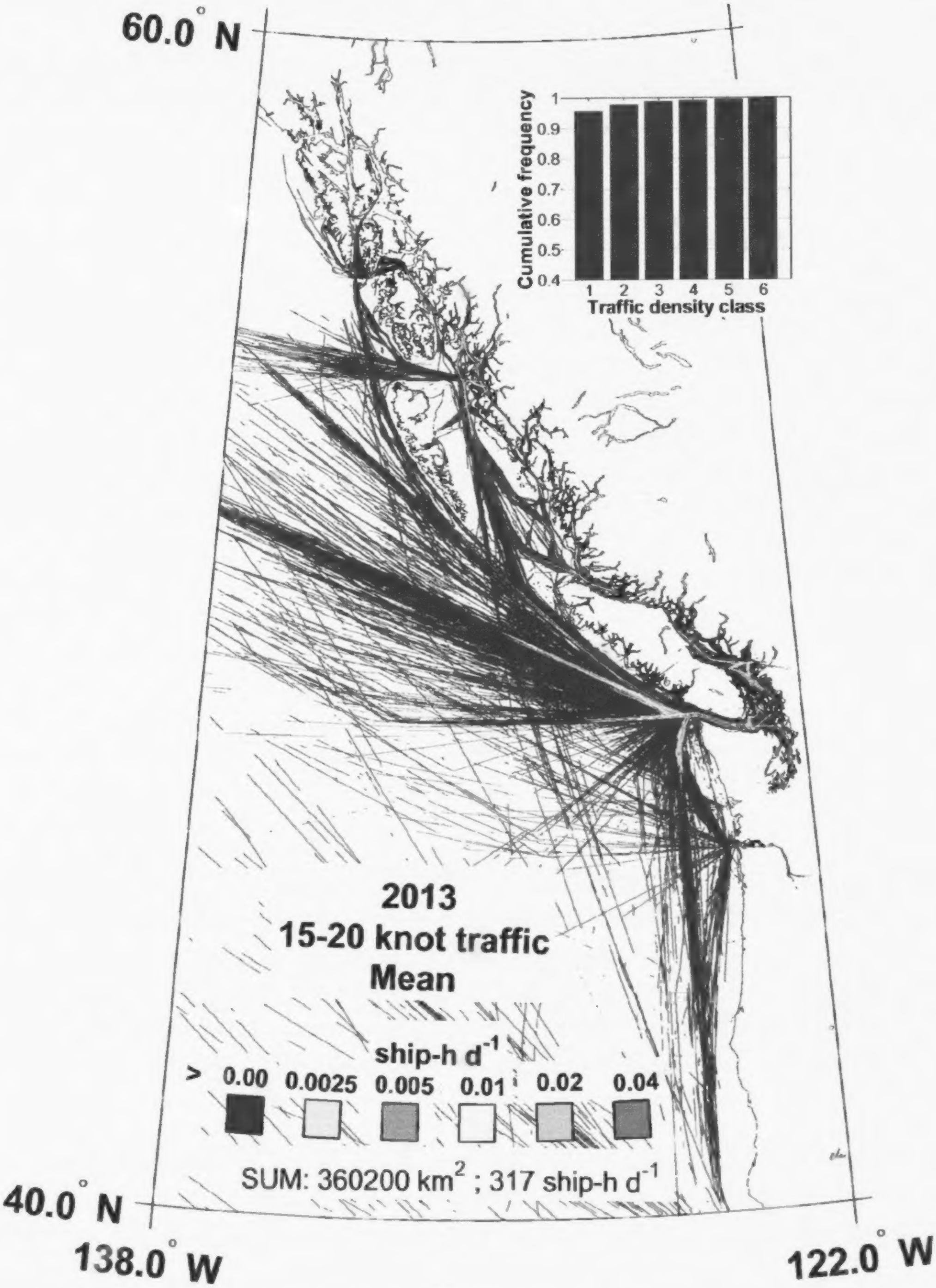

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 360200 km^2 ; 317 ship-h d^{-1}

Figure 24. Map of 15–20 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

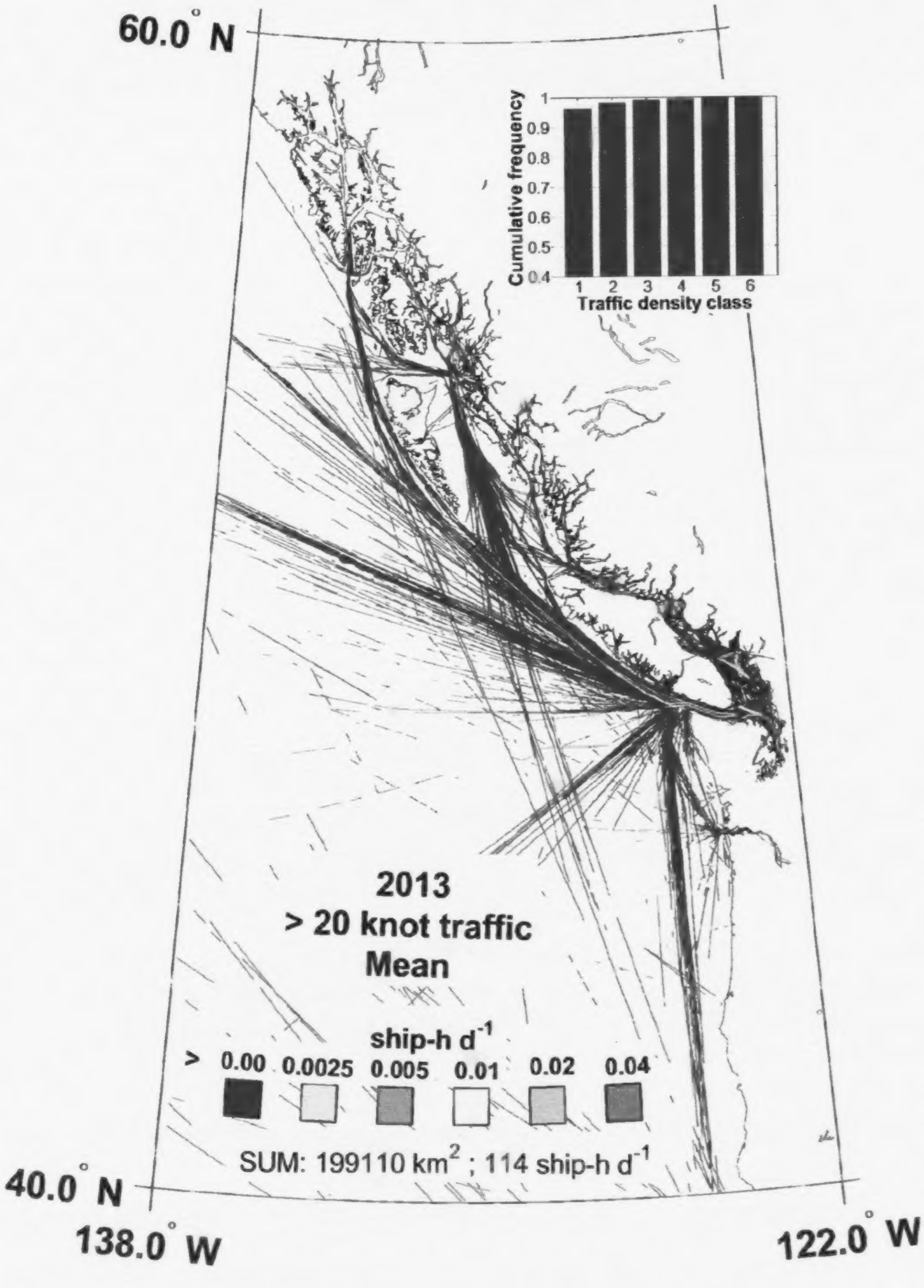

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
2013
> 20 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 199110 km² ; 114 ship-h d⁻¹

Figure 25. Map of >20 knot AIS mean traffic density in 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8. MONTHLY TRAFFIC MAPS

8.1. January 2013

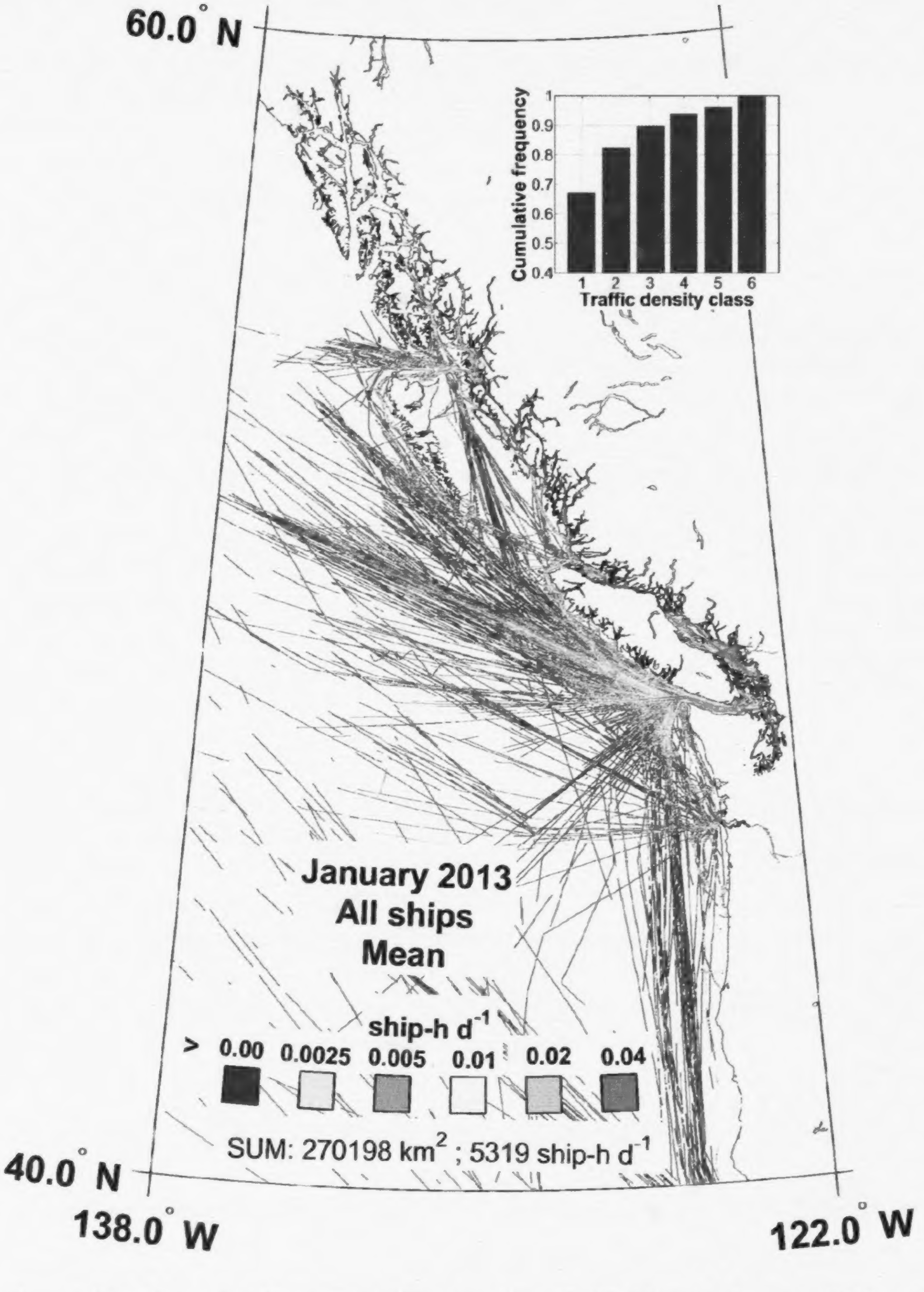

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
January 2013
All ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 270198 km2 ; 5319 ship-h d-1

Figure 26. Map of AIS mean traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

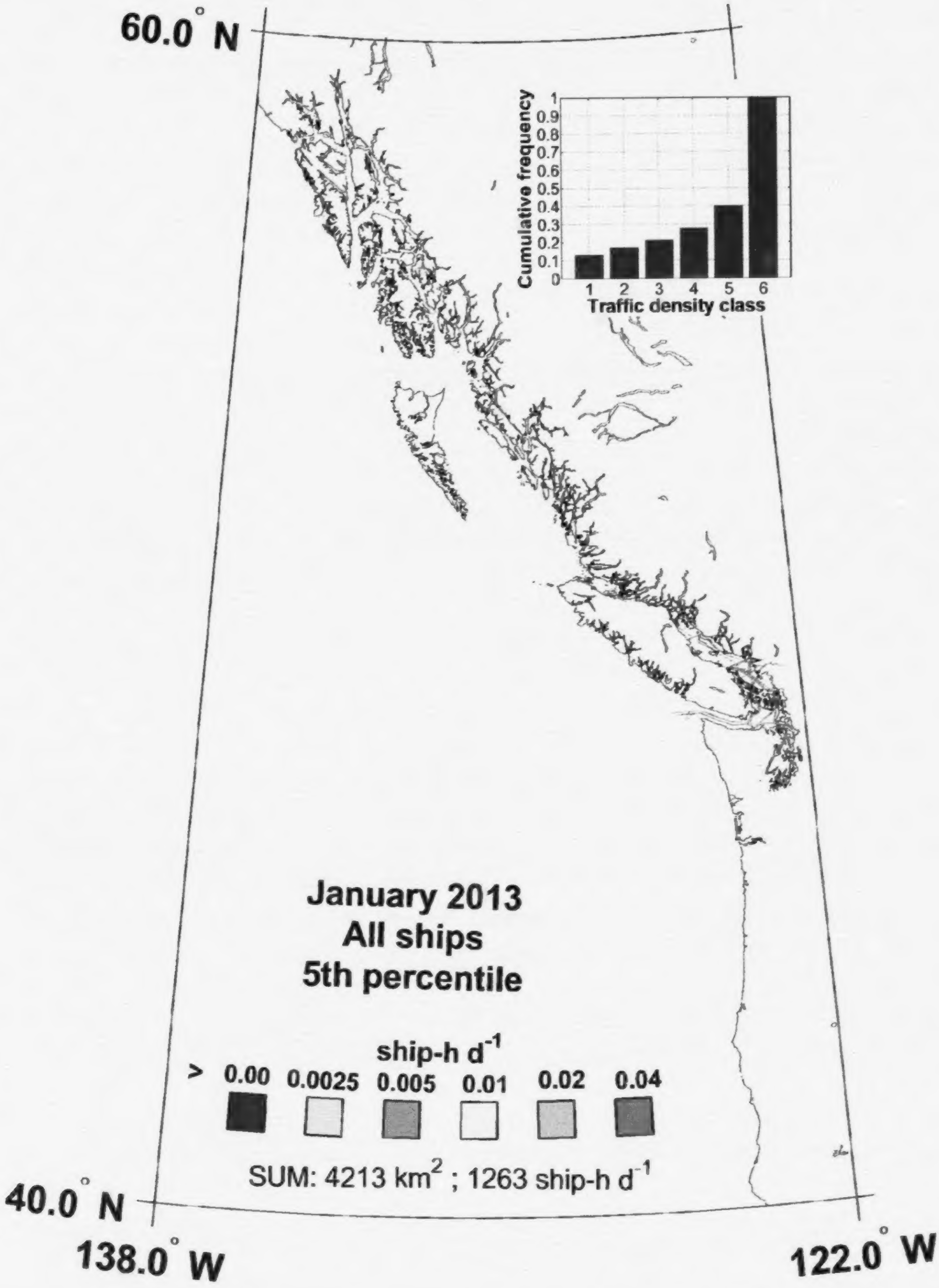

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
January 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 4213 km^2 ; 1263 ship-h d^{-1}

Figure 27. Map of the 5th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

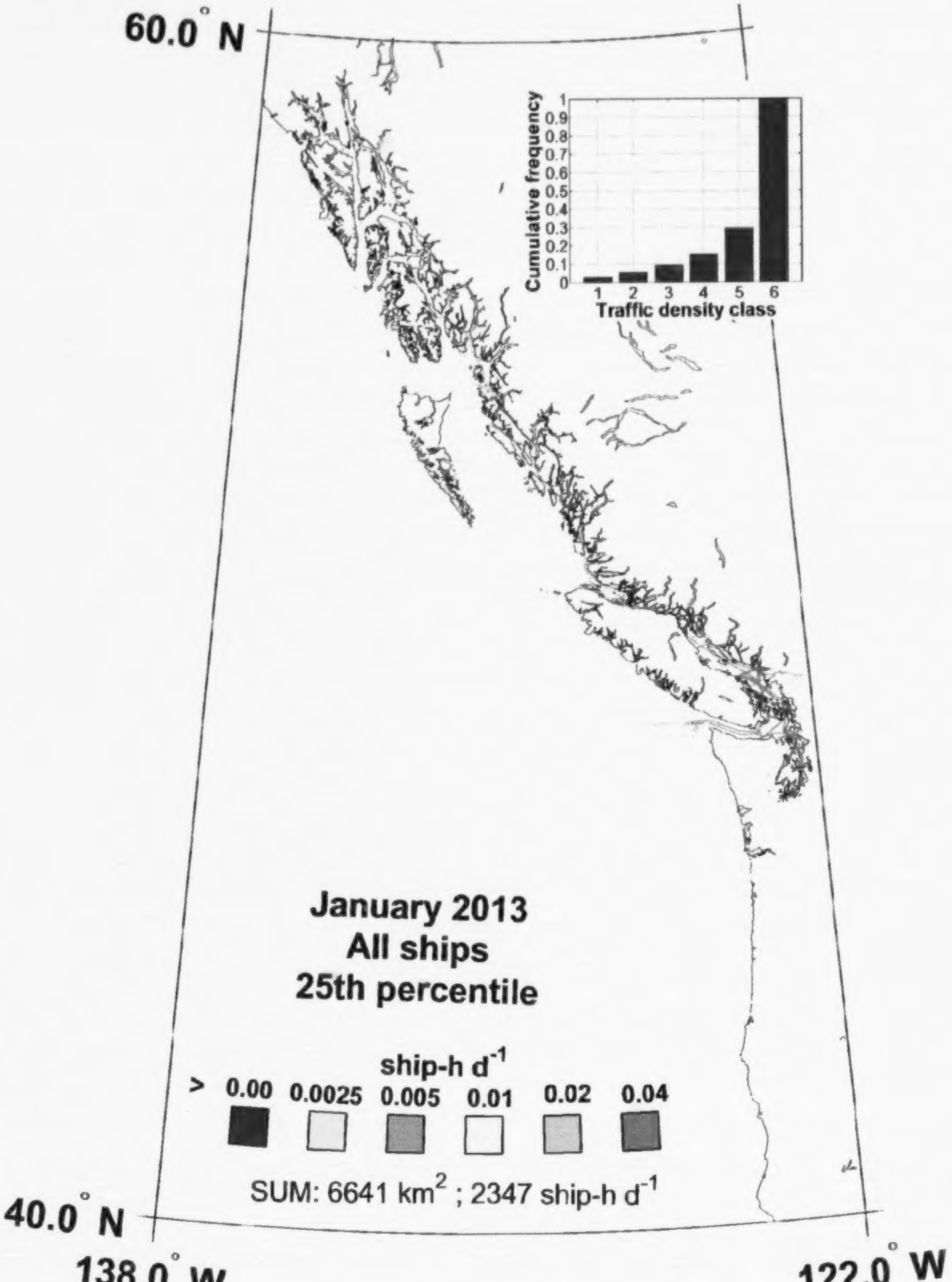

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
January 2013
All ships
25th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 6641 km2 ; 2347 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 28. Map of the 25th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

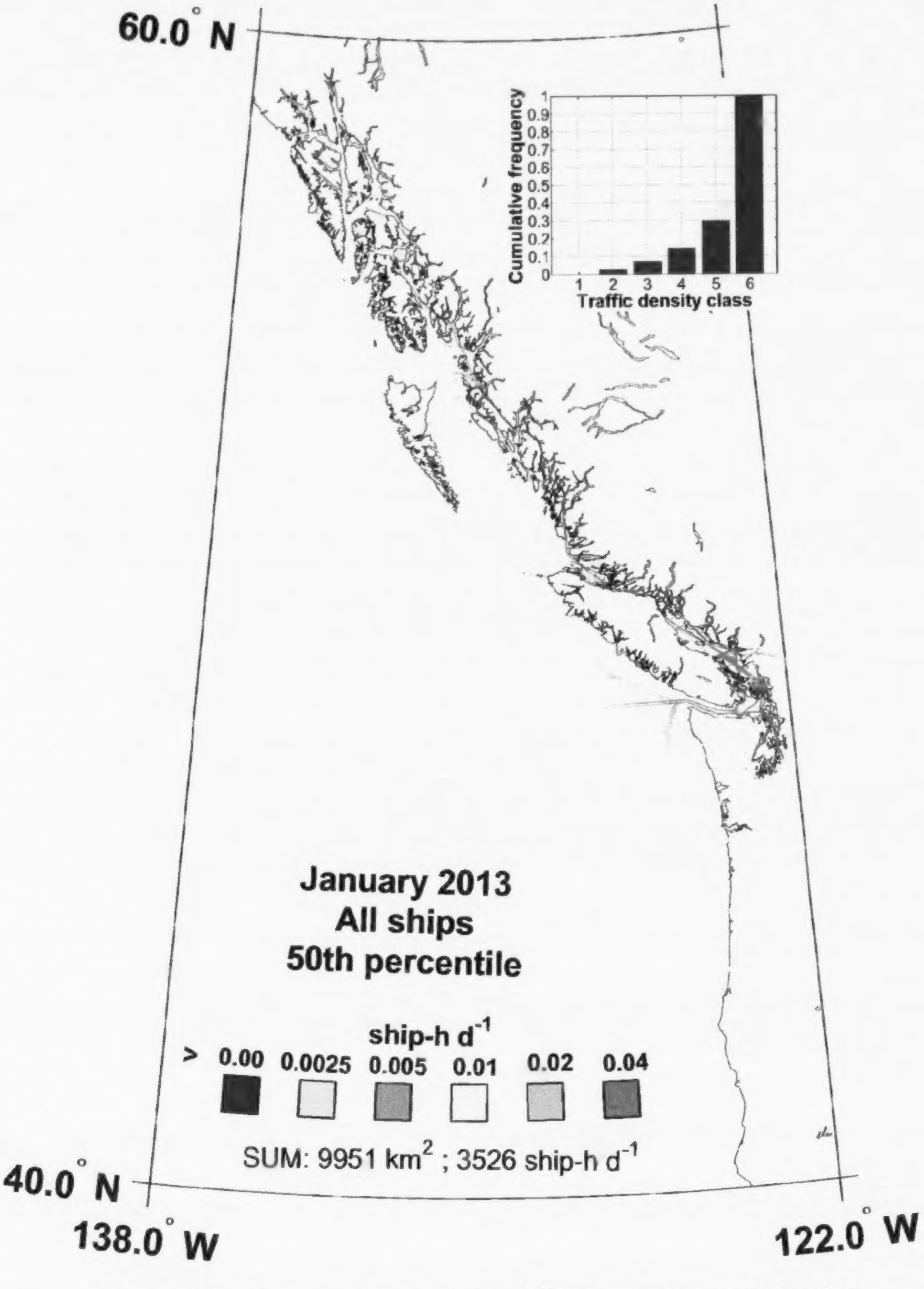

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
January 2013
All ships
50th percentile
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 9951 km² ; 3526 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 29. Map of the 50th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

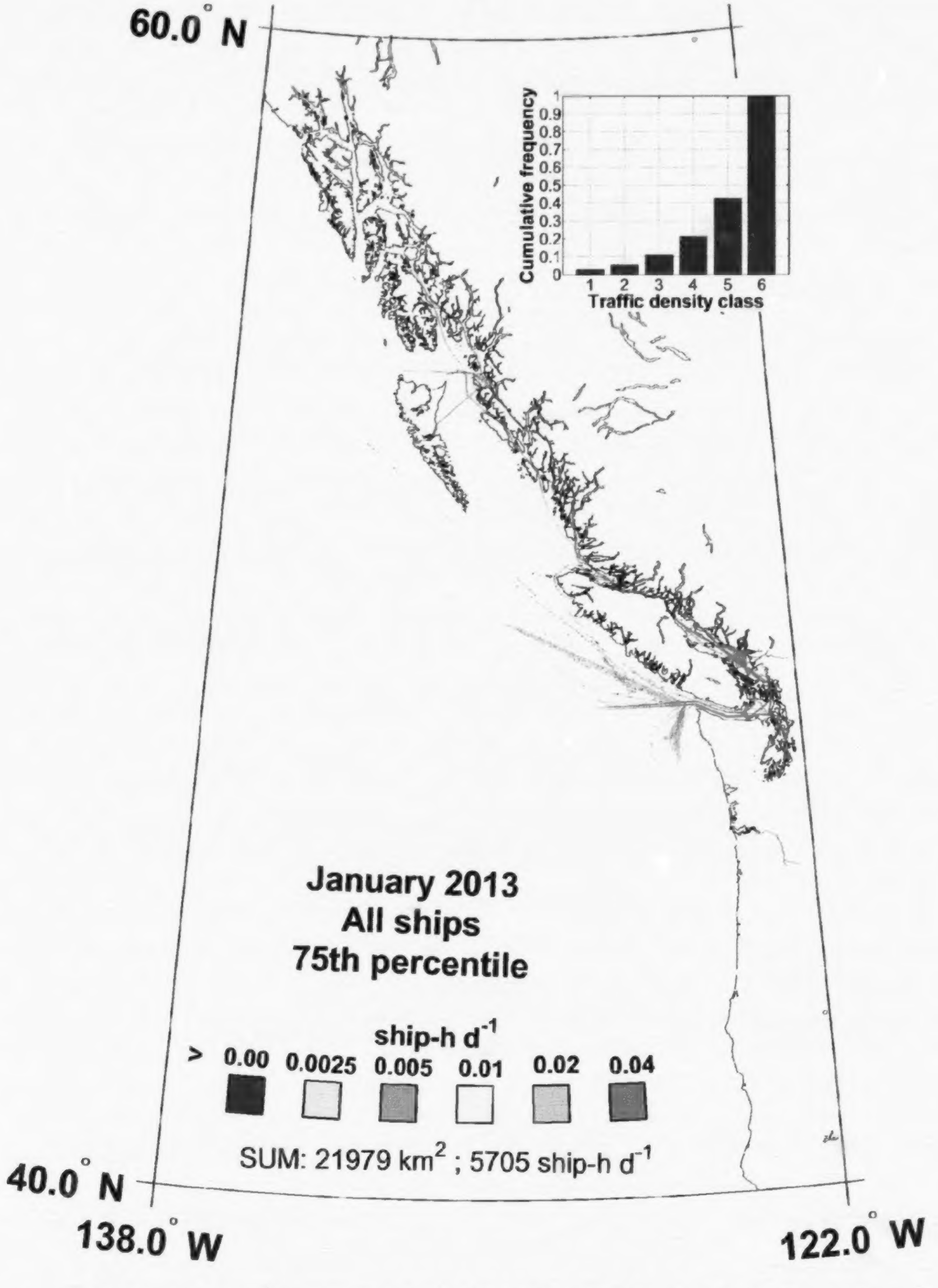

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
January 2013
All ships
75th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 21979 km^2 ; 5705 ship-h d^{-1}

Figure 30. Map of the 75th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

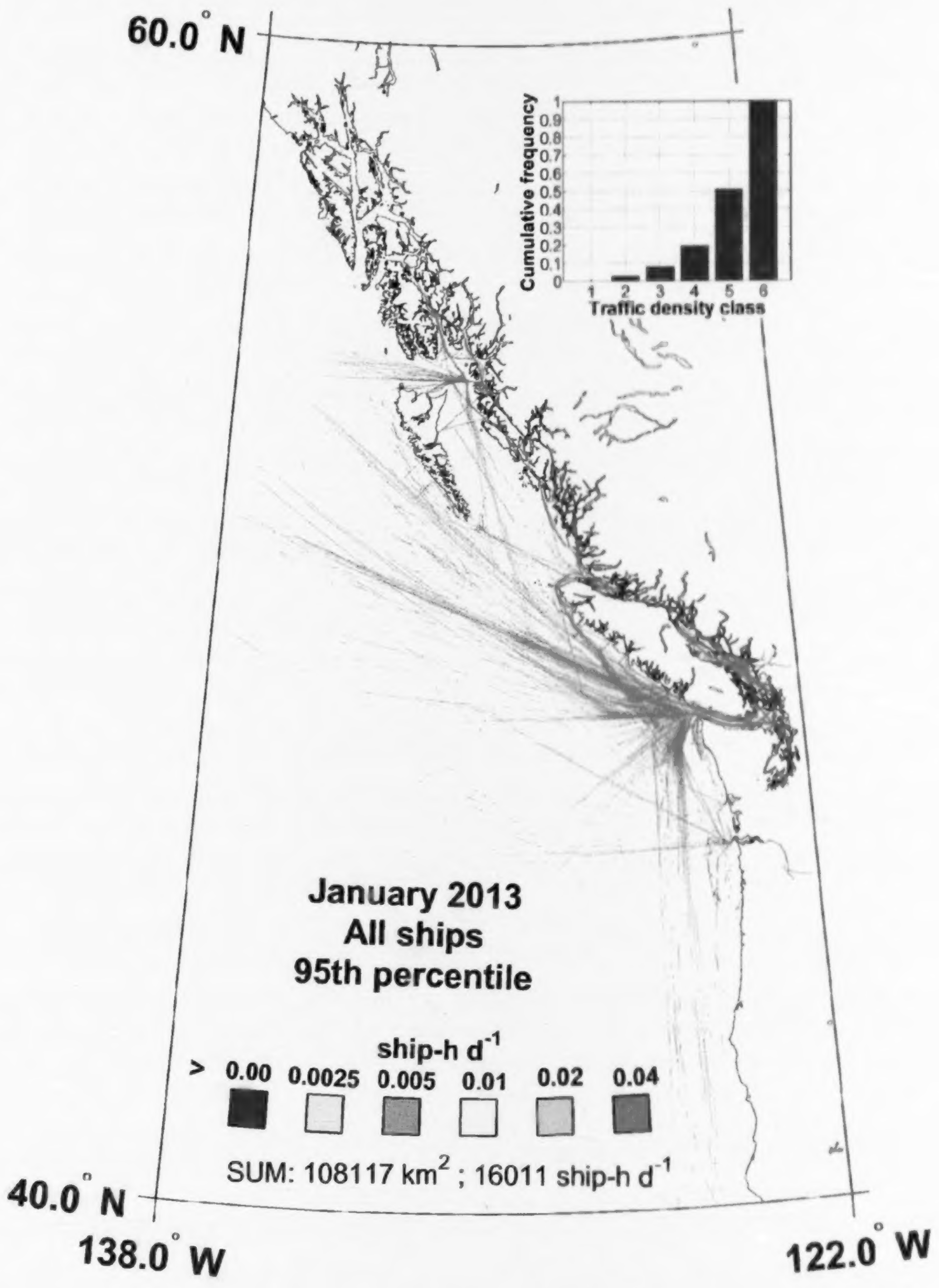

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
January 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 108117 km^2 ; 16011 ship-h d^{-1}

Figure 31. Map of the 95th percentile of the daily AIS traffic density of all ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

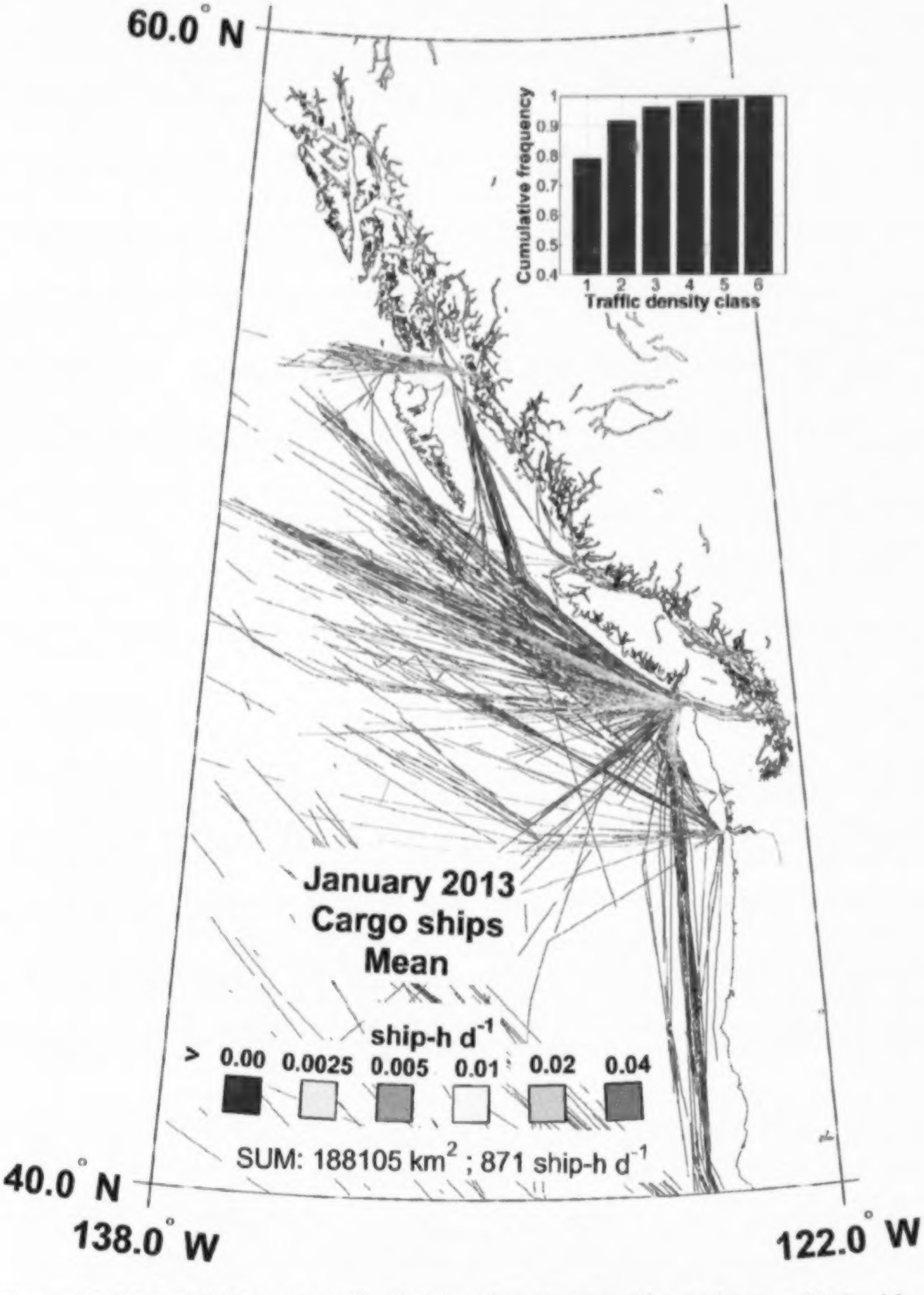

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
January 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 188105 km^2 ; 871 ship-h d^{-1}

Figure 32. Map of AIS mean traffic density of cargo-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

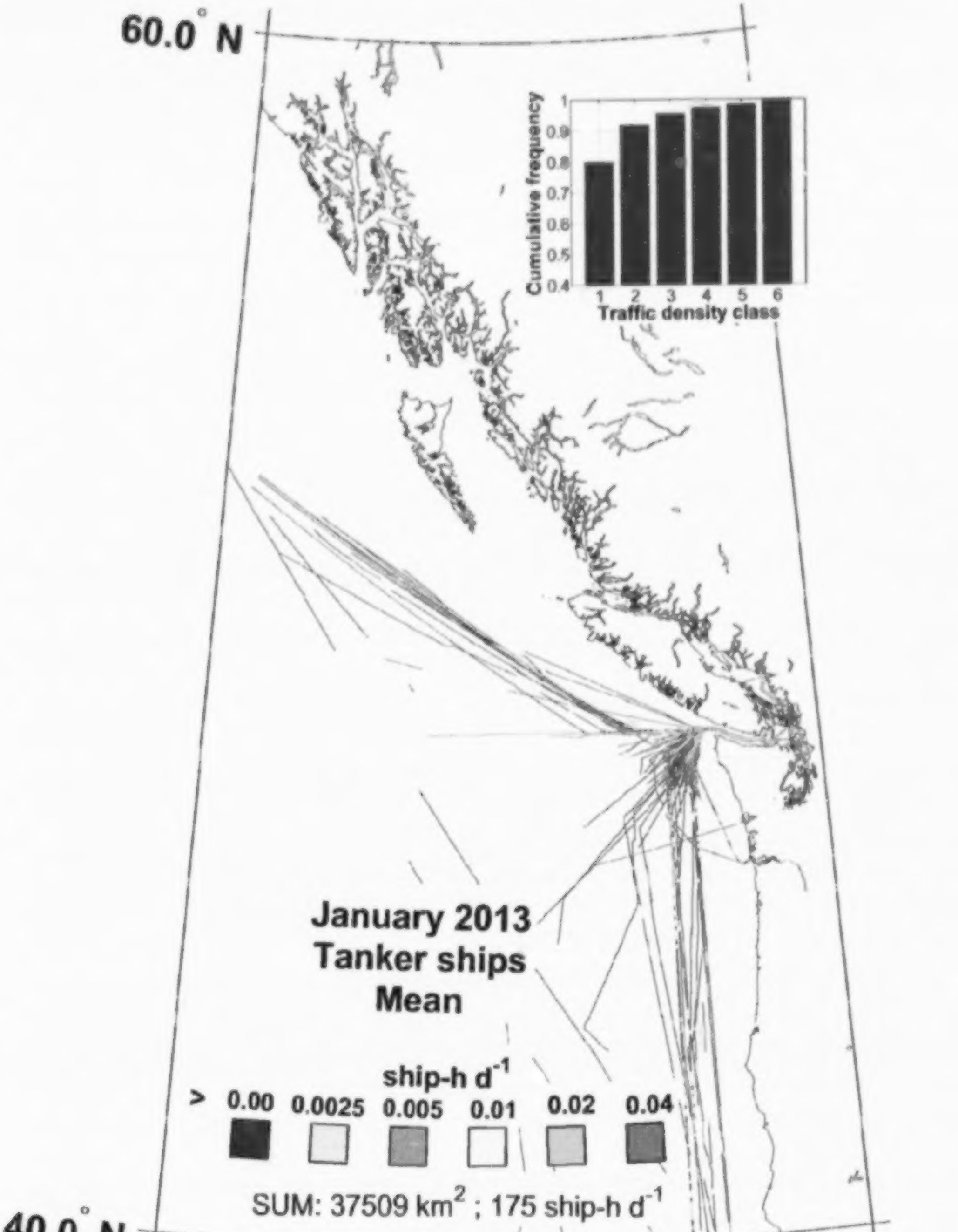

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
January 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 37509 km^2 ; 175 ship-h d^{-1}

Figure 33. Map of AIS mean traffic density of tanker-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

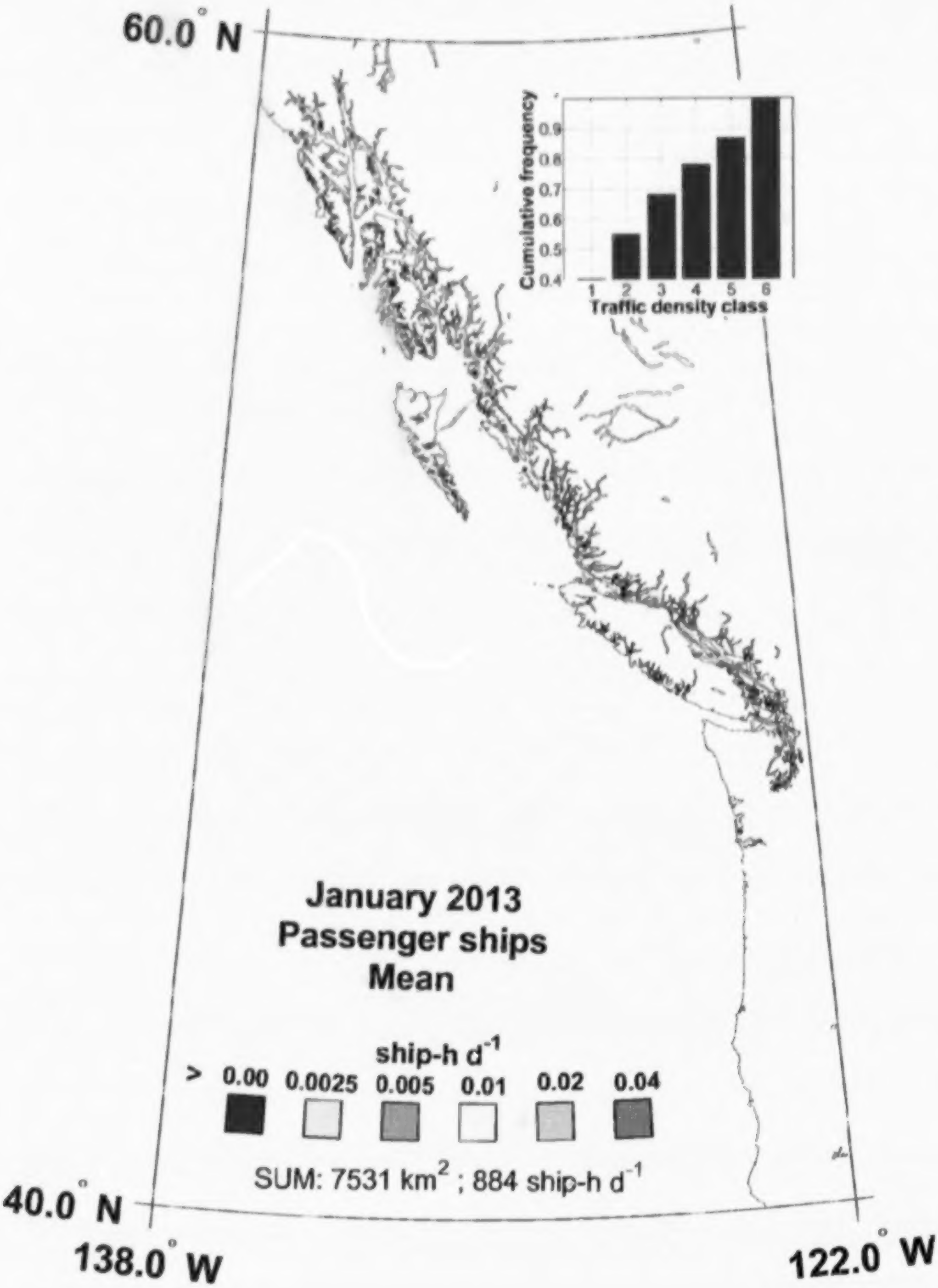

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
January 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7531 km^2 ; 884 ship-h d^{-1}

Figure 34. Map of AIS mean traffic density of passenger-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

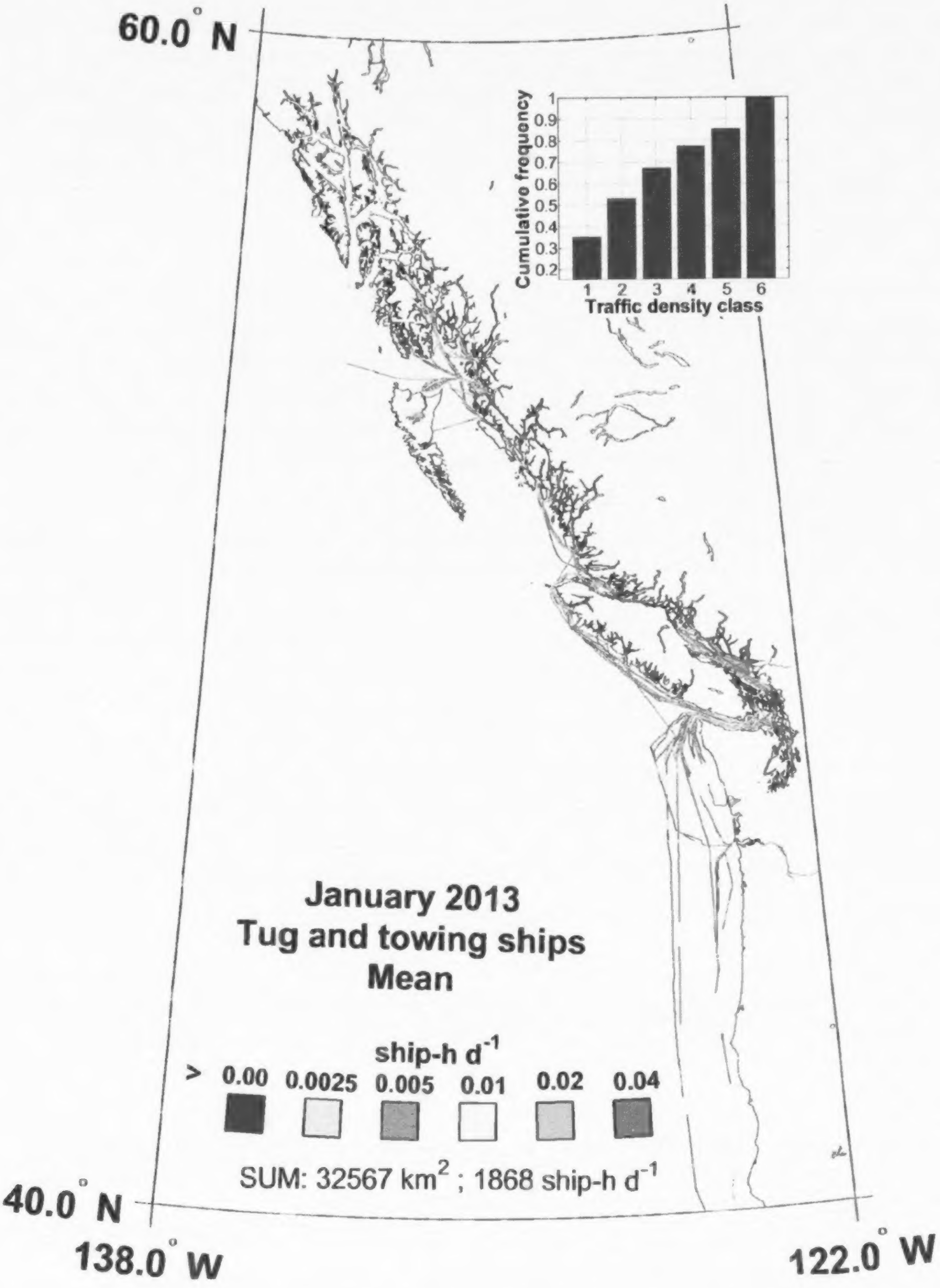

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
January 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 32567 km^2 ; 1868 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 35. Map of AIS mean traffic density of tug and towing -type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

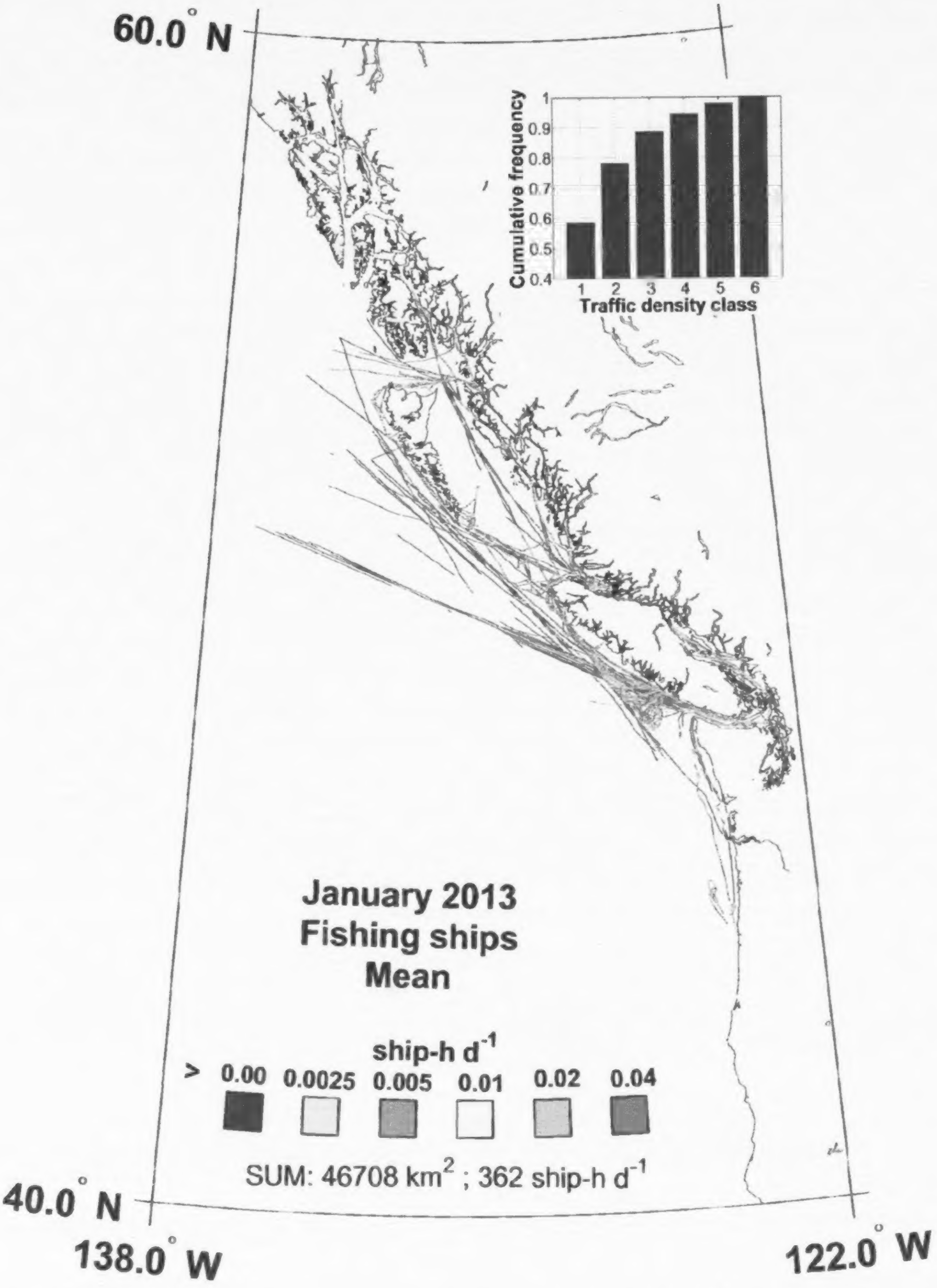

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
January 2013
Fishing ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 46708 km2 ; 362 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 36. Map of AIS mean traffic density of fishing-type ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

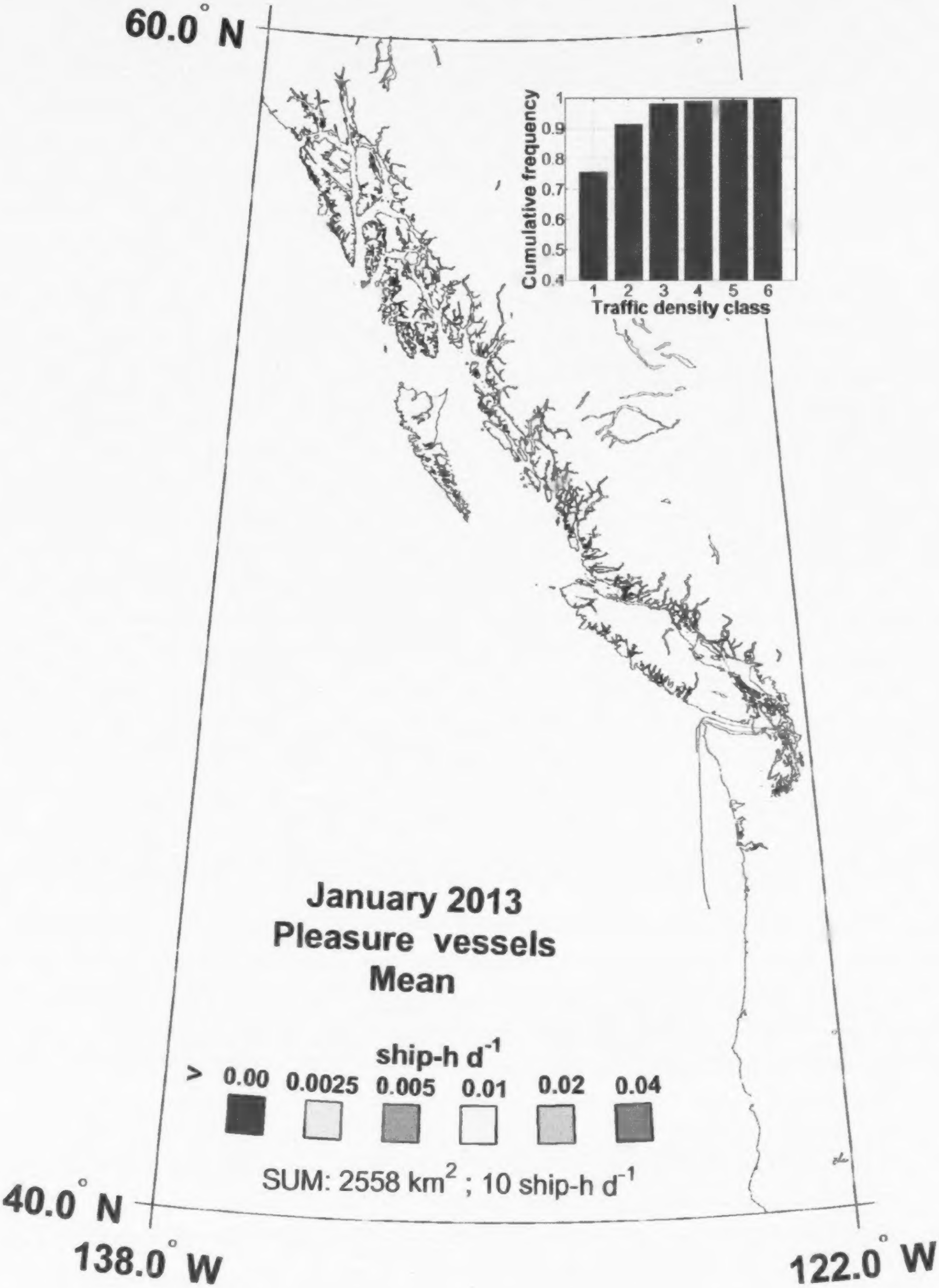

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
January 2013
Pleasure vessels
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 2558 km² ; 10 ship-h d⁻¹

Figure 37. Map of AIS mean traffic density of pleasure-type vessels in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

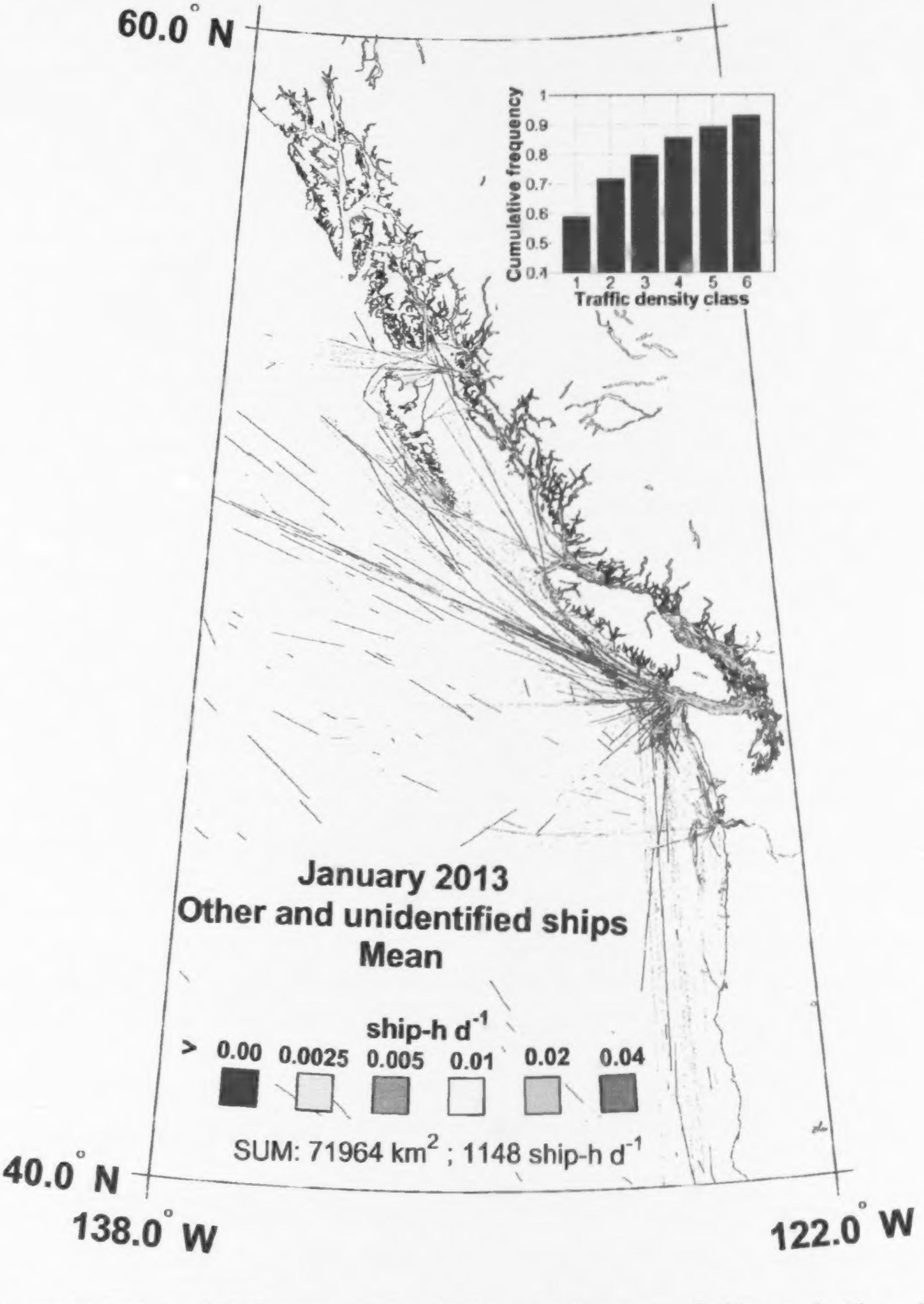

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
January 2013
Other and unidentified ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 71964 km² ; 1148 ship-h d⁻¹

Figure 38. Map of AIS mean traffic density of other type of ships and ships of unidentified type in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

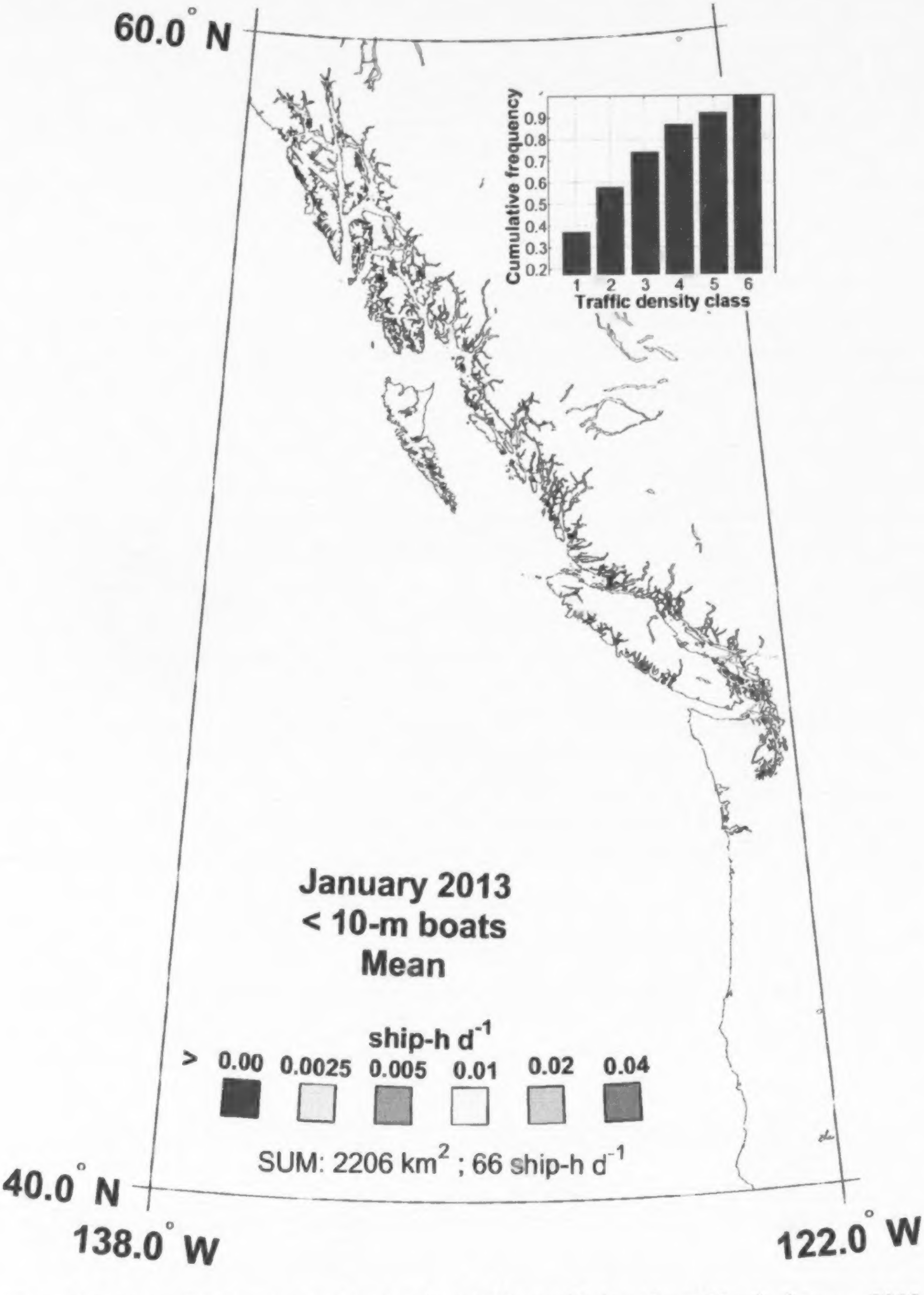

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
2
3
4
5
6
Traffic density class
January 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 2206 km^2 ; 66 ship-h d^{-1}

Figure 39. Map of AIS mean traffic density of ships with lengths < 10 min January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

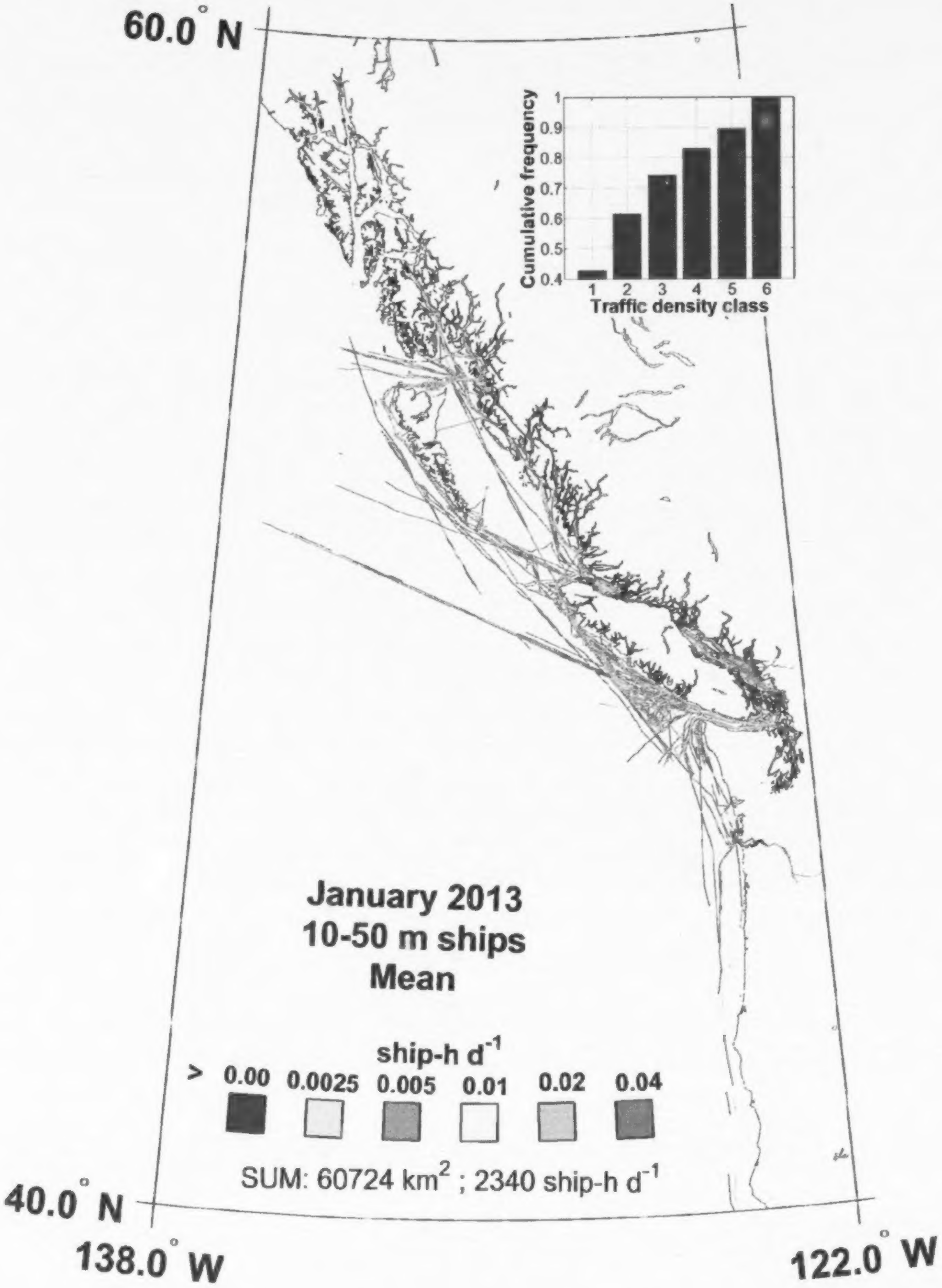

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
January 2013
10-50 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 60724 km^2 ; 2340 ship-h d^{-1}

Figure 40. Map of AIS mean traffic density of 10 to 50 m ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

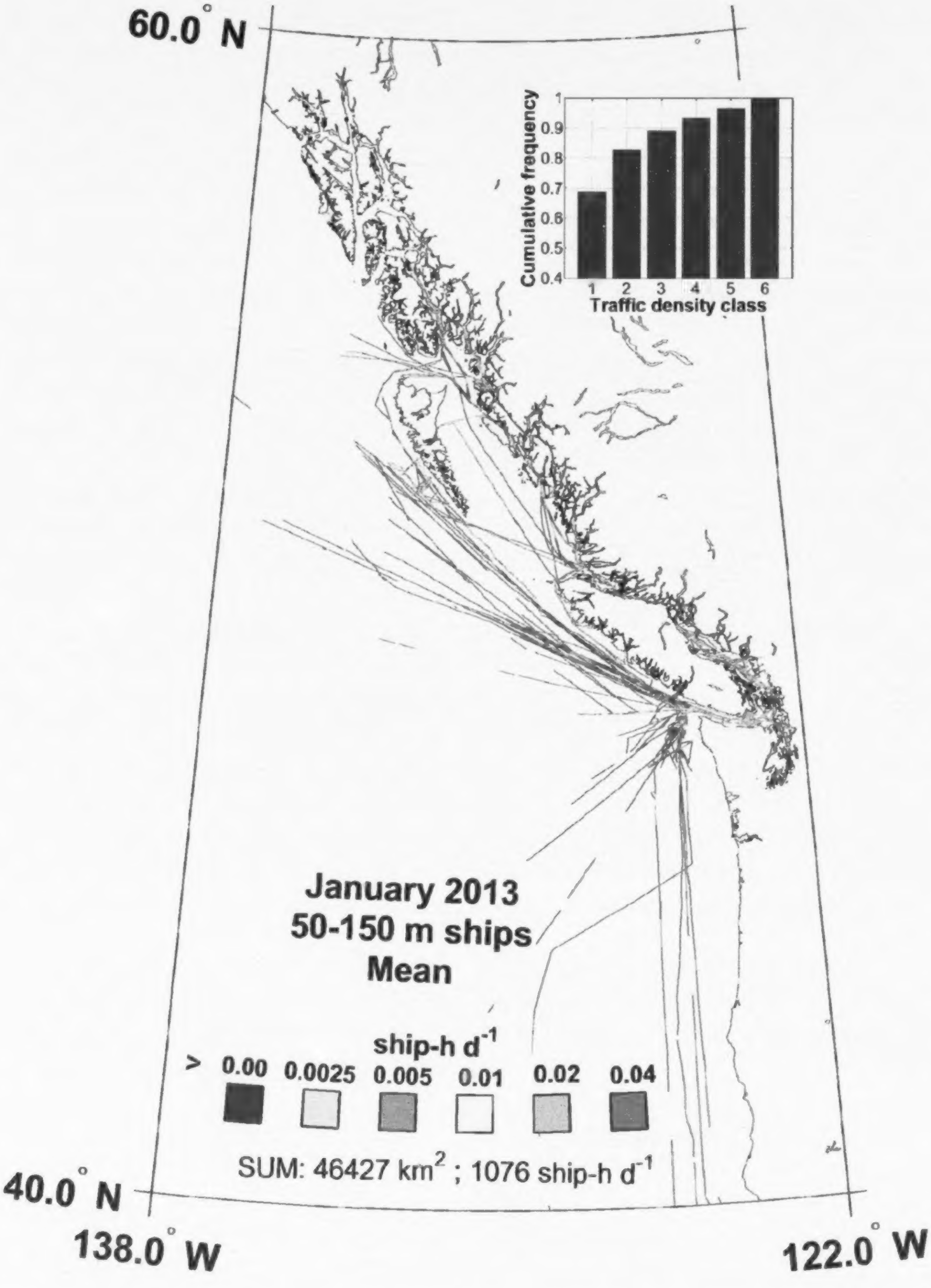

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
January 2013
50-150 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 46427 km² ; 1076 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 41. Map of AIS mean traffic density of 50 to 150 m ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

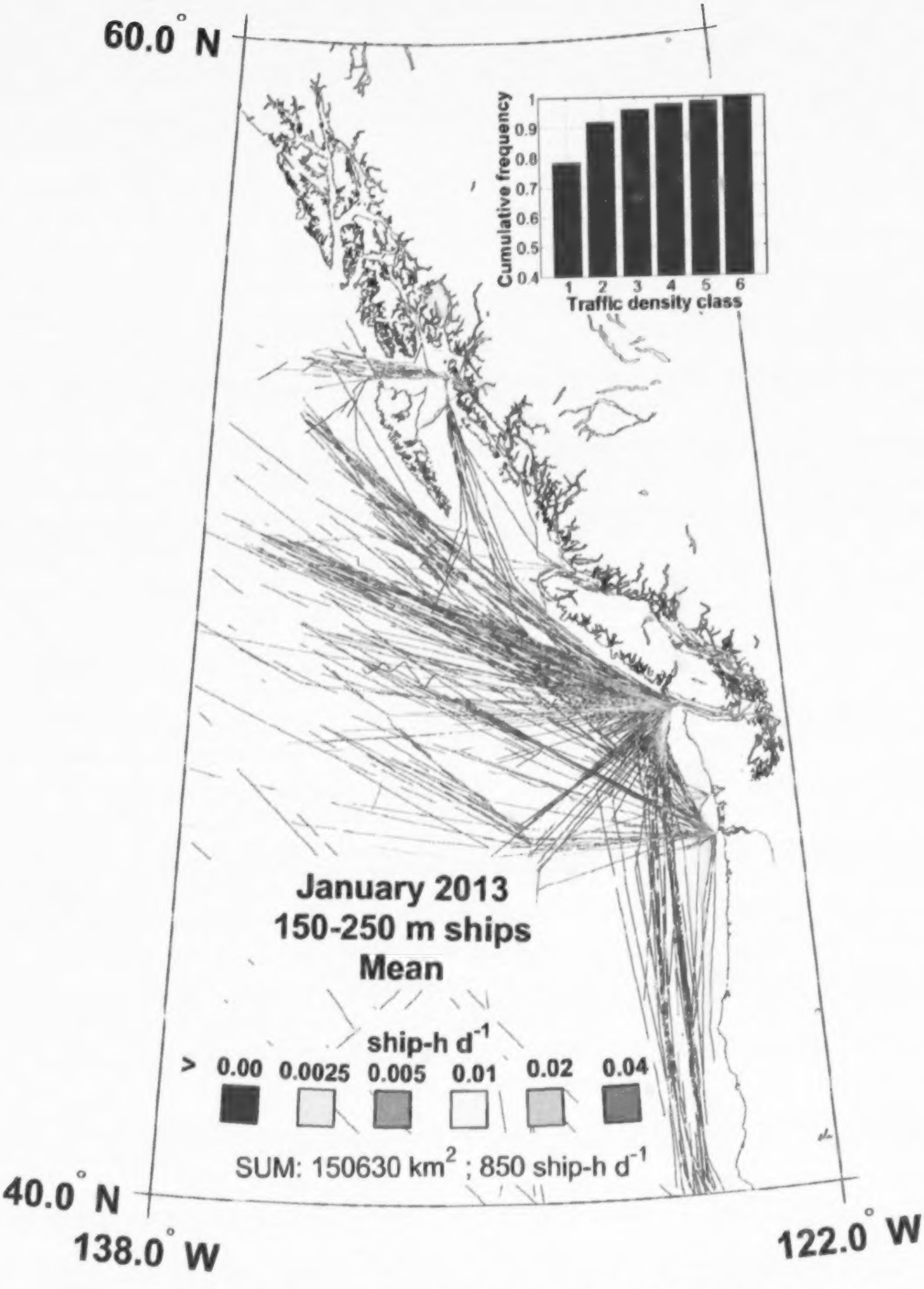

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
January 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 150630 km^{2} ; 850 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 42. Map of AIS mean traffic density of 150 to 250 m ships in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

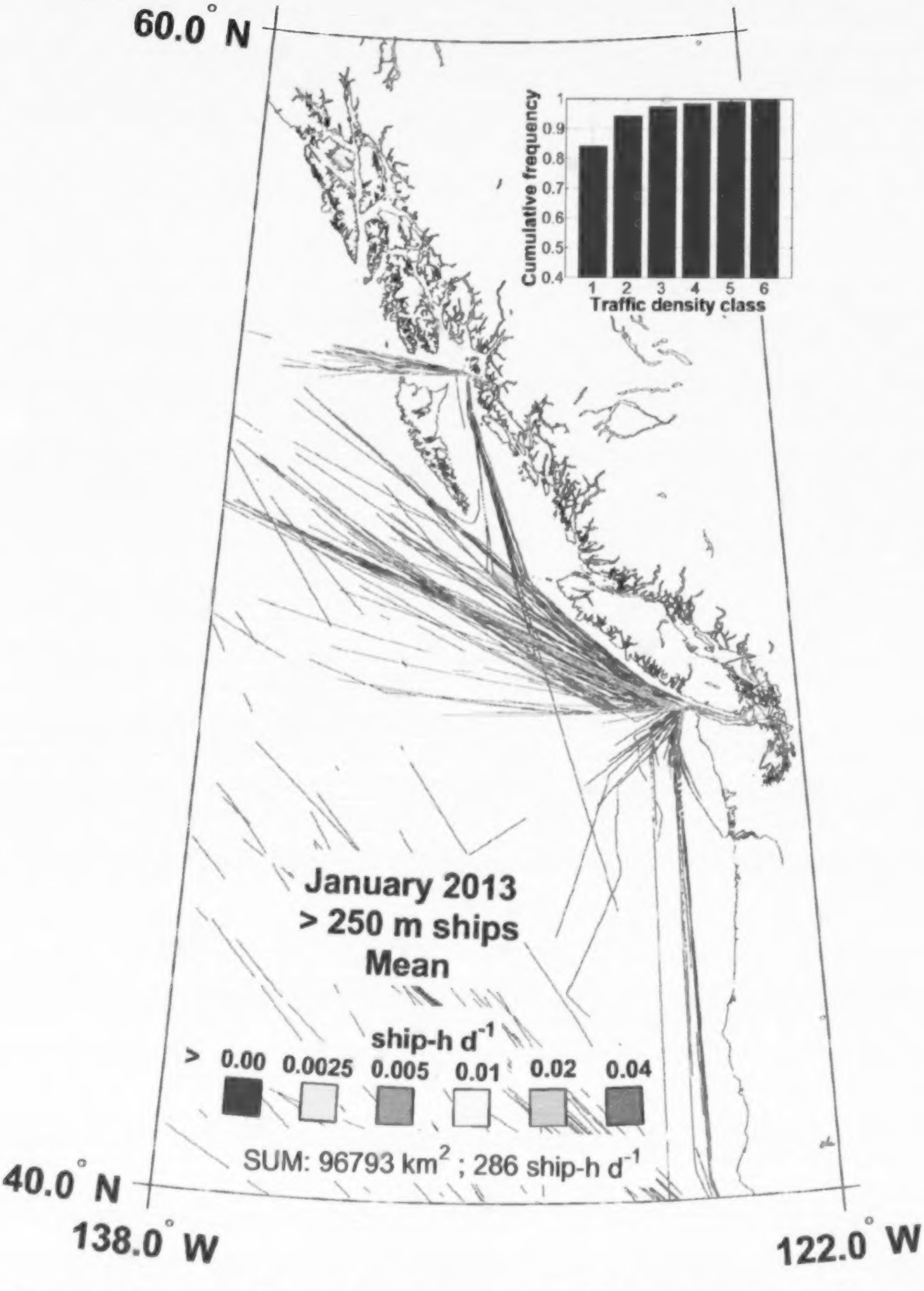

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
January 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 96793 km^2 ; 286 ship-h d^{-1}

Figure 43. Map of >250 m ship AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

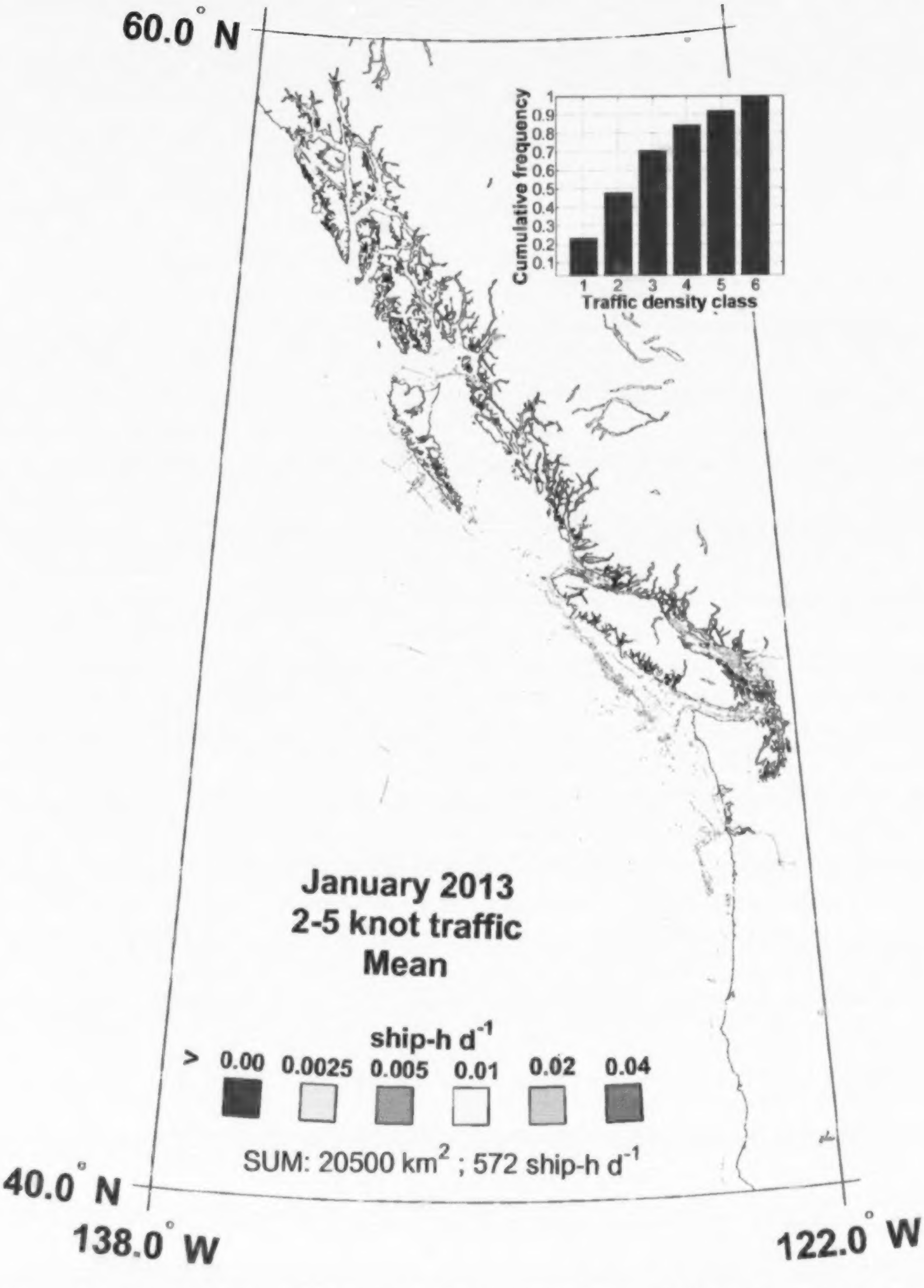

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
January 2013
2-5 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 20500 km^2 ; 572 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 44. Map of 2–5 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

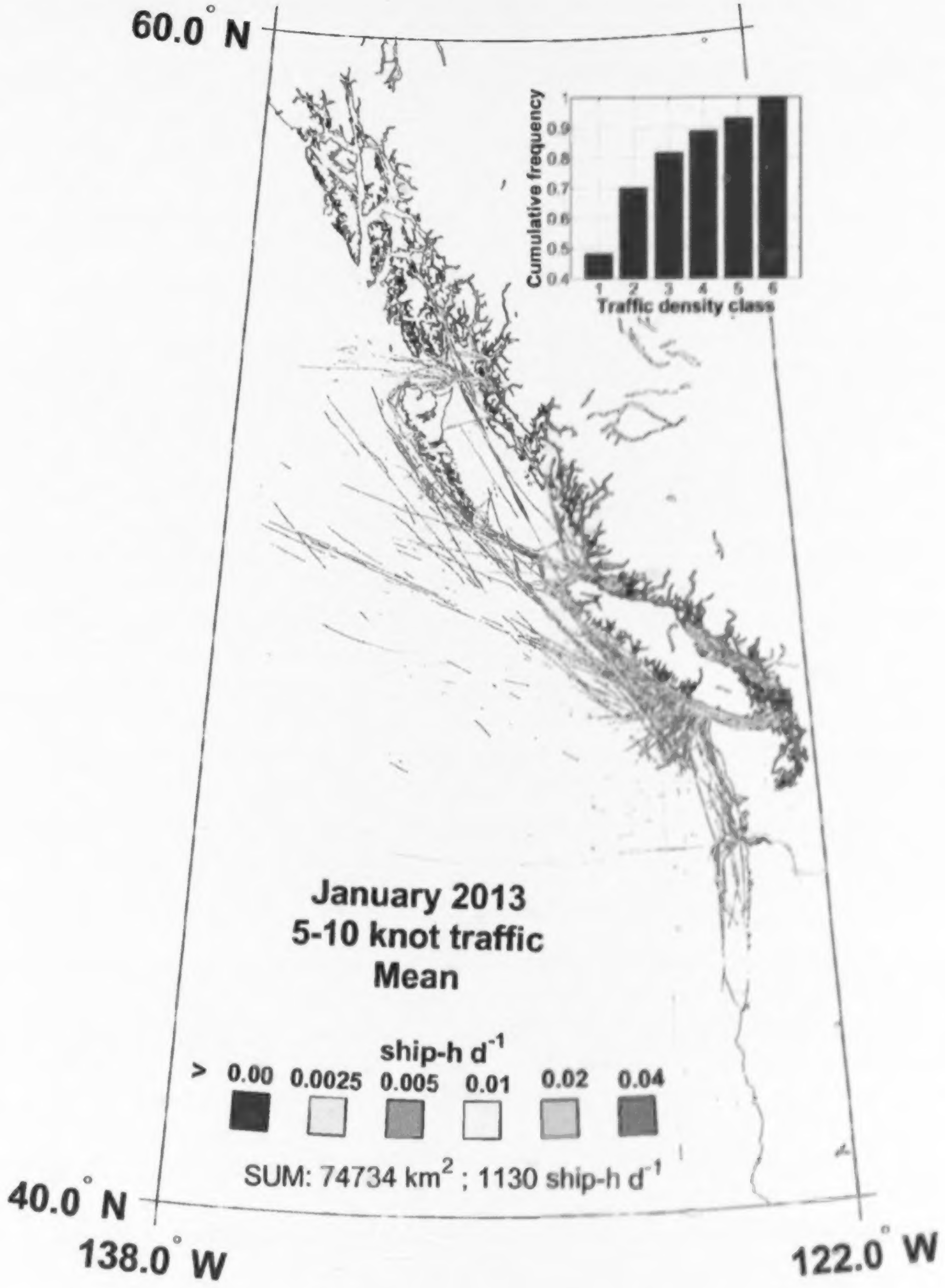

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
January 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 74734 km^2 ; 1130 ship-h d^{-1}

Figure 45. Map of 5–10 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

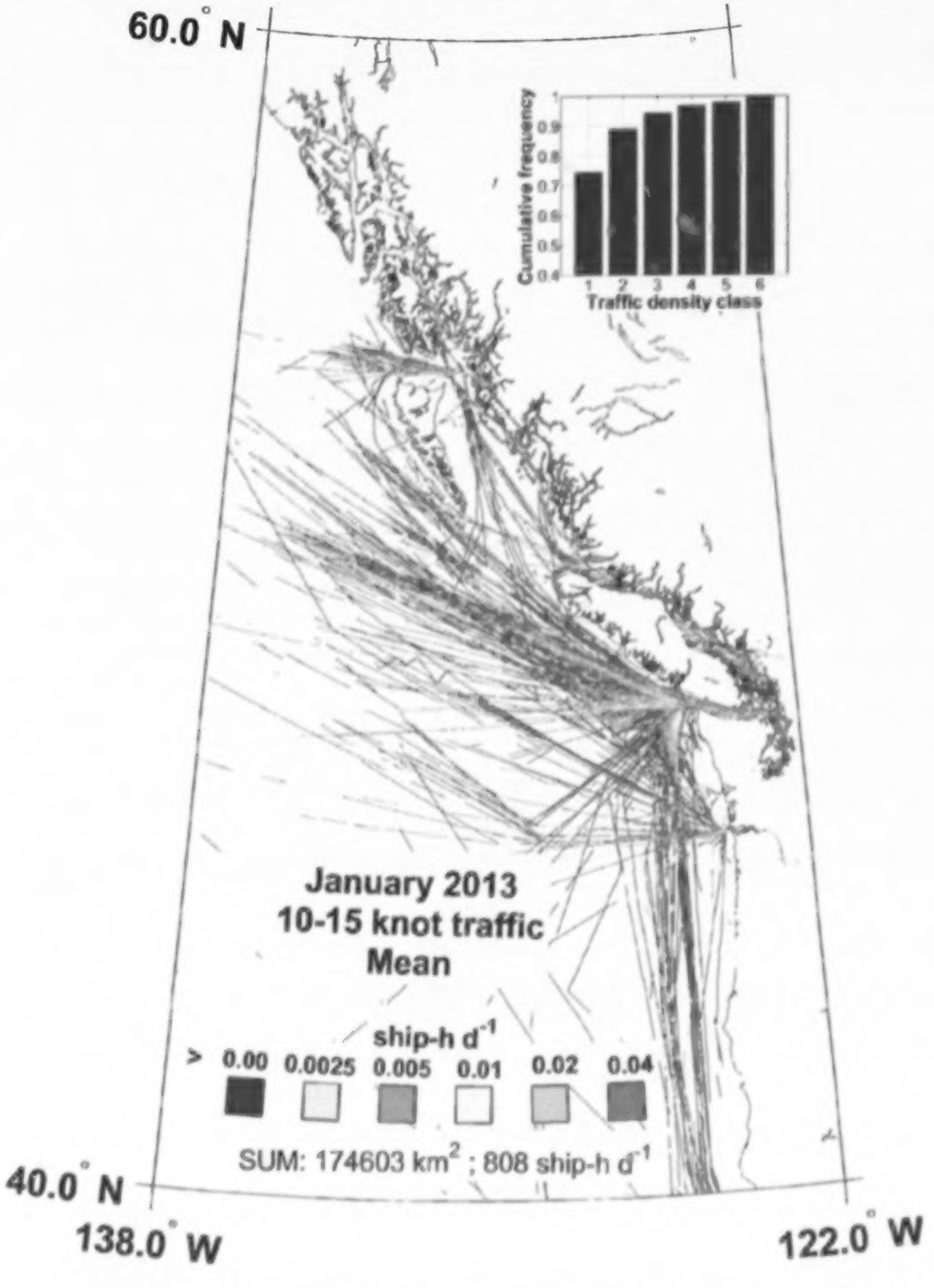

60.0° N
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
January 2013
10-15 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 174603 km² ; 808 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 46. Map of 10–15 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

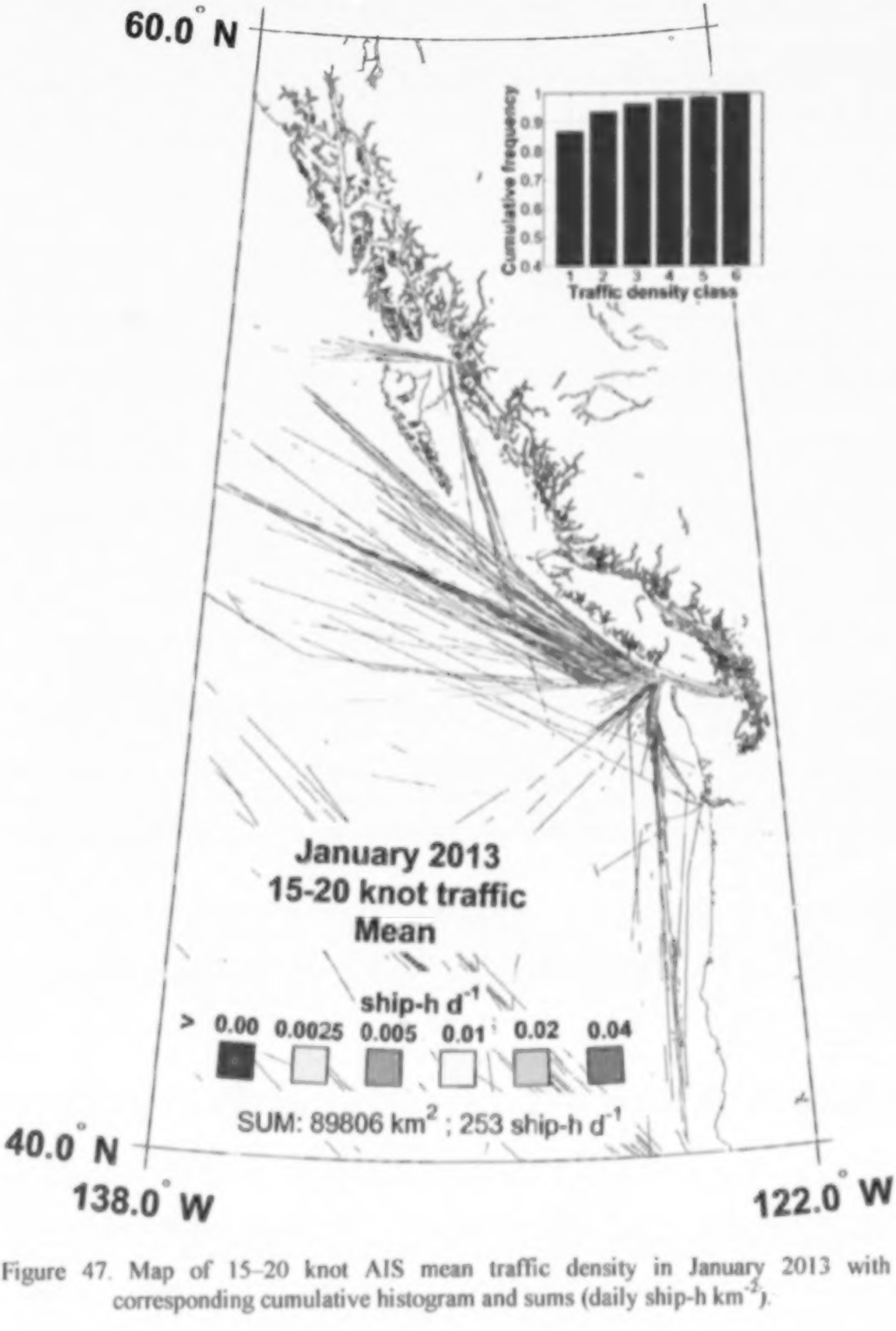

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
January 2013
15-20 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 89806 km² ; 253 ship-h d⁻¹

Figure 47. Map of 15–20 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

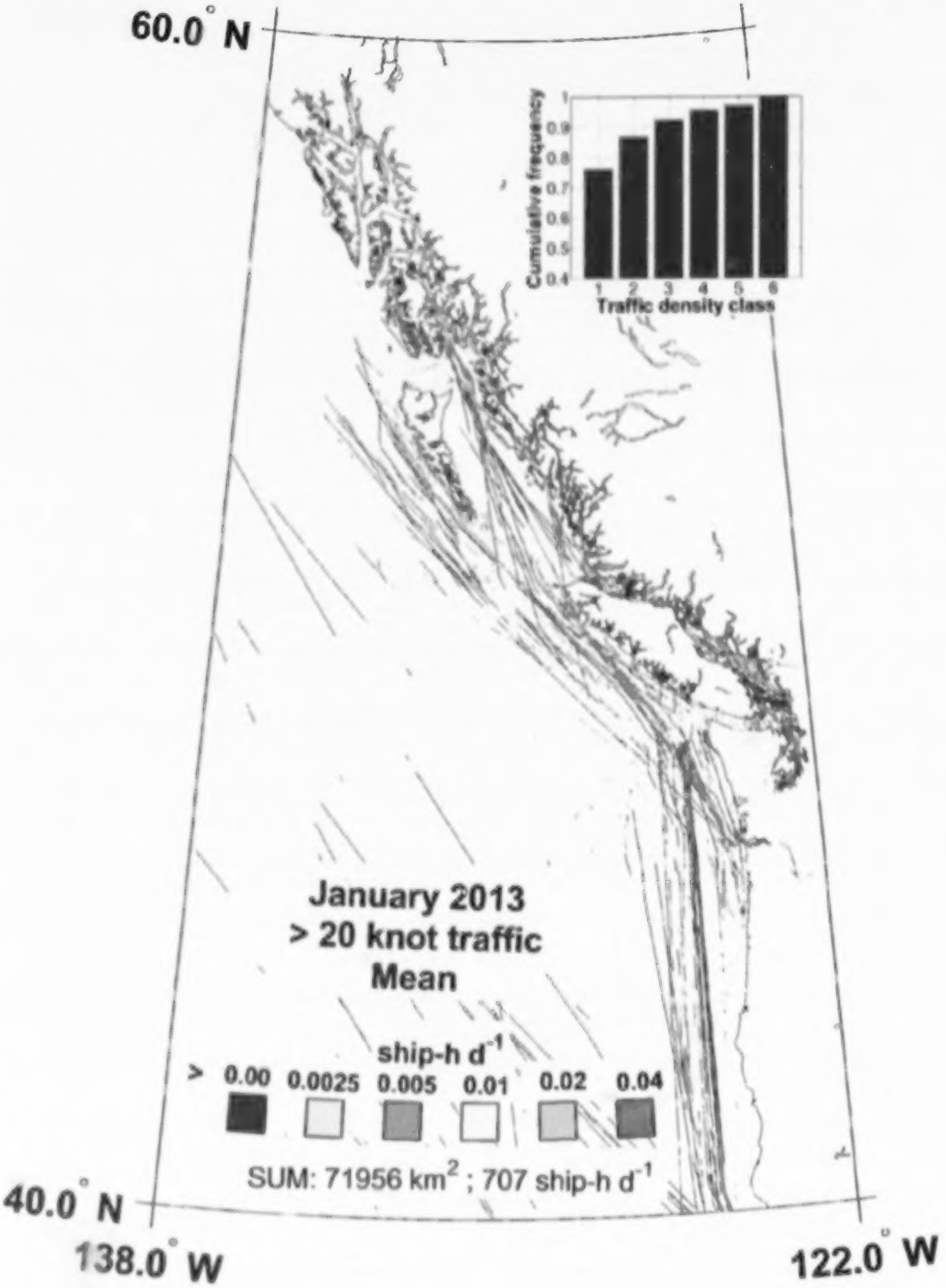

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
January 2013
> 20 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 71956 km² ; 707 ship-h d⁻¹

Figure 48. Map of >20 knot AIS mean traffic density in January 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.2. February 2013

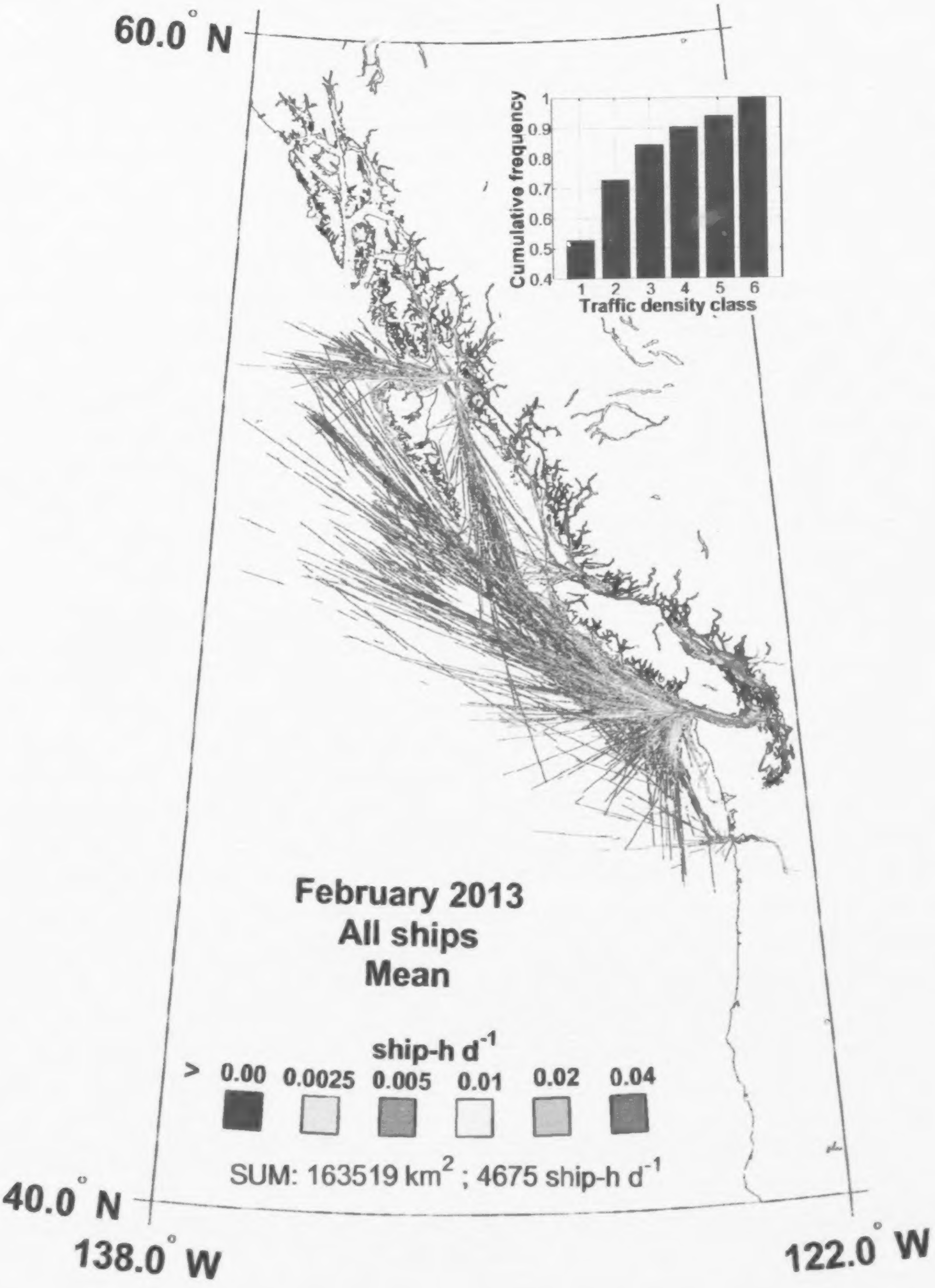

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
February 2013
All ships
Mean
ship-h d^-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 163519 km² ; 4675 ship-h d^-1

Figure 49. Map of AIS mean traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

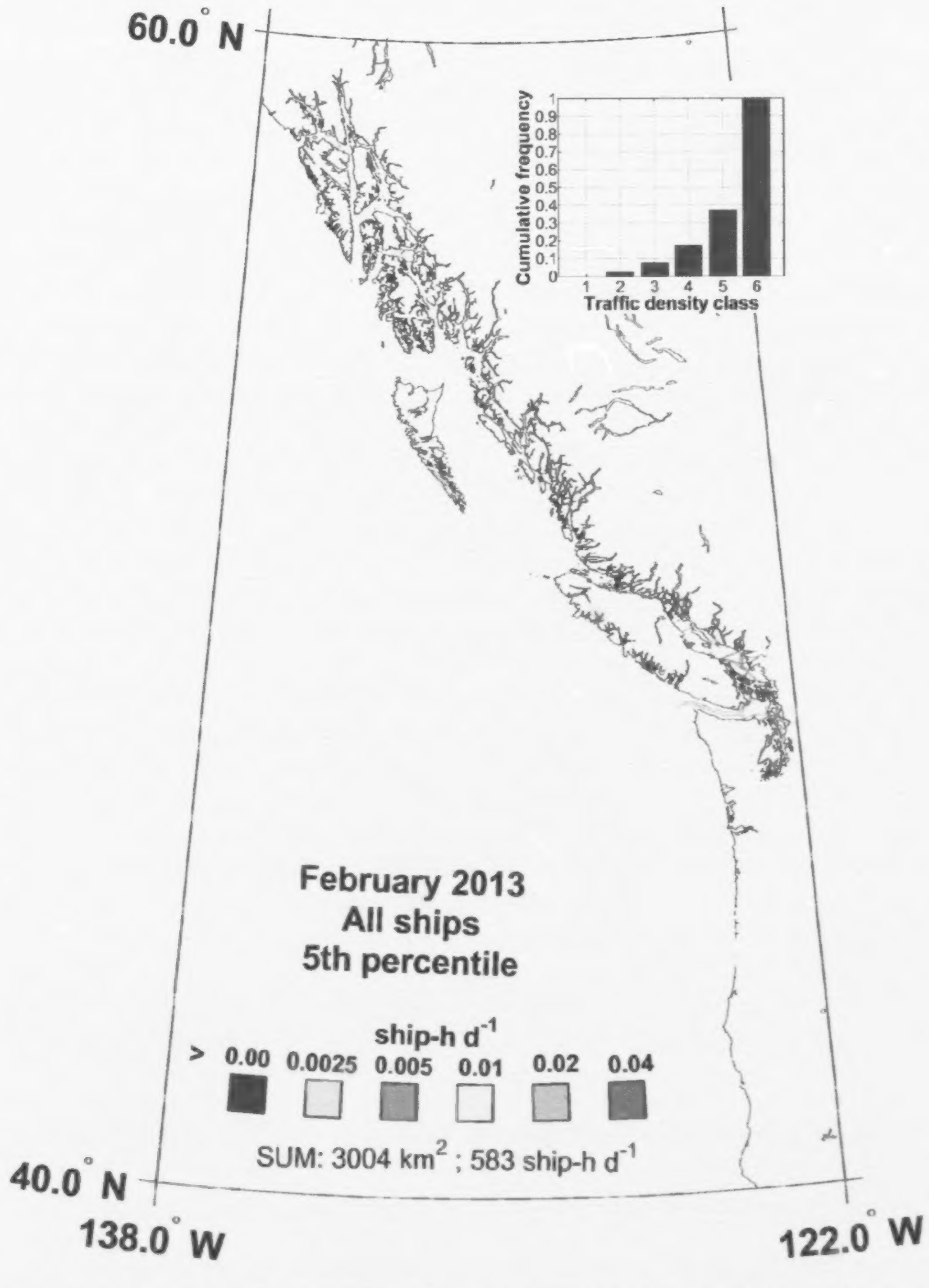

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
February 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 3004 km^2 ; 583 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 50. Map of the 5th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

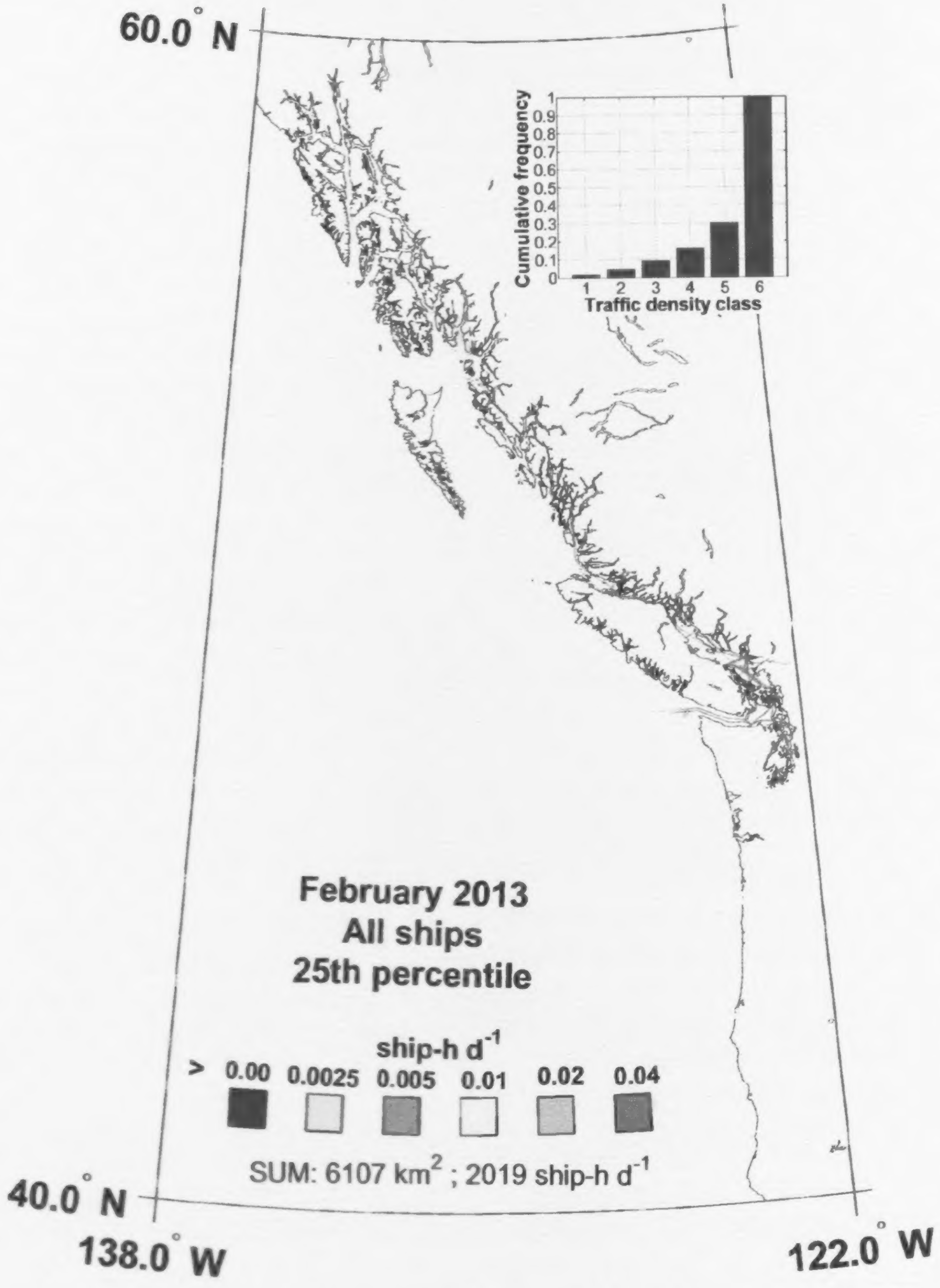

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
February 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 6107 km^2 ; 2019 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 51. Map of the 25th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

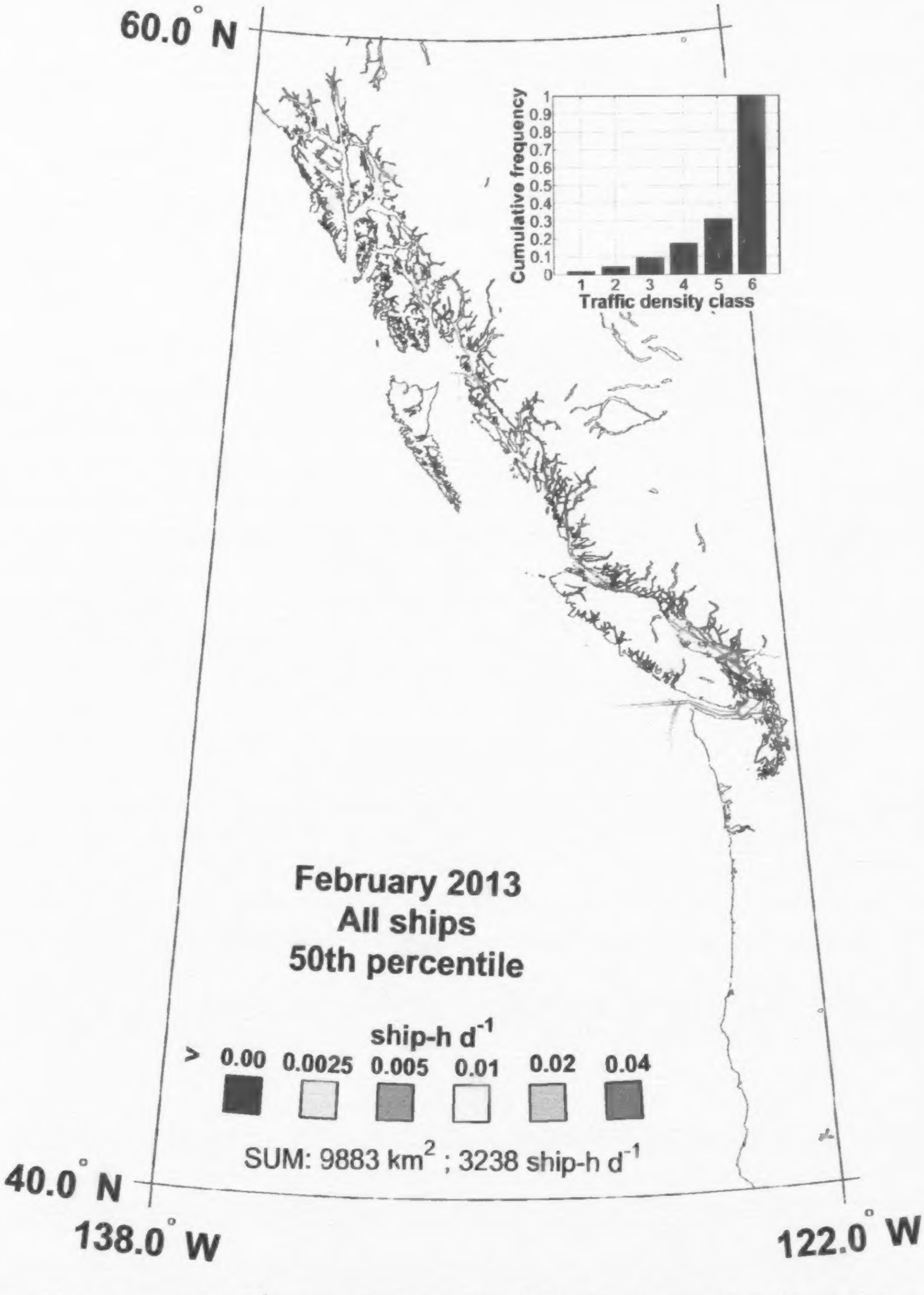

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
February 2013
All ships
50th percentile
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 9883 km2 ; 3238 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 52. Map of the 50th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

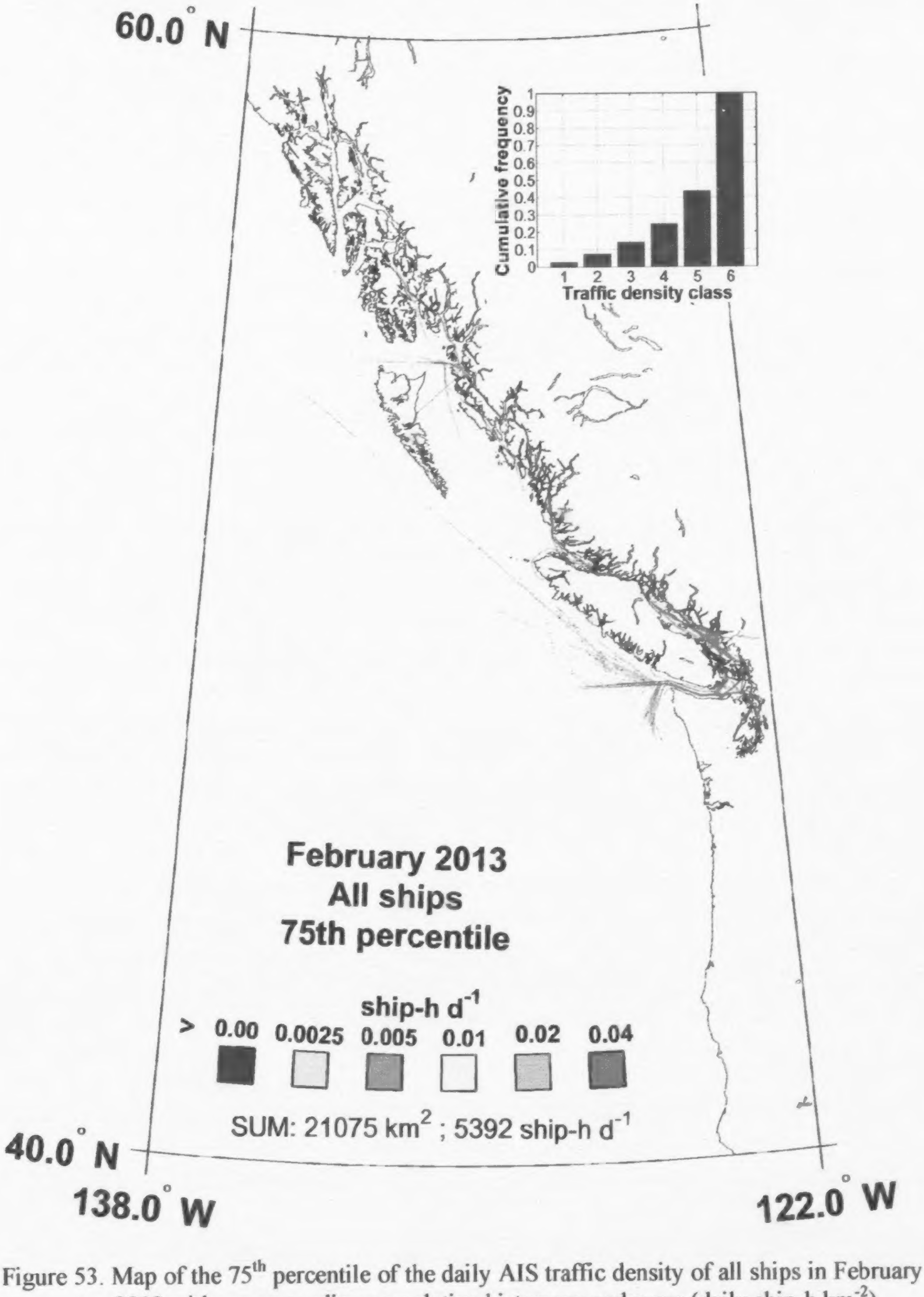

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
February 2013
All ships
75th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 21075 km^2 ; 5392 ship-h d^{-1}

Figure 53. Map of the 75th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

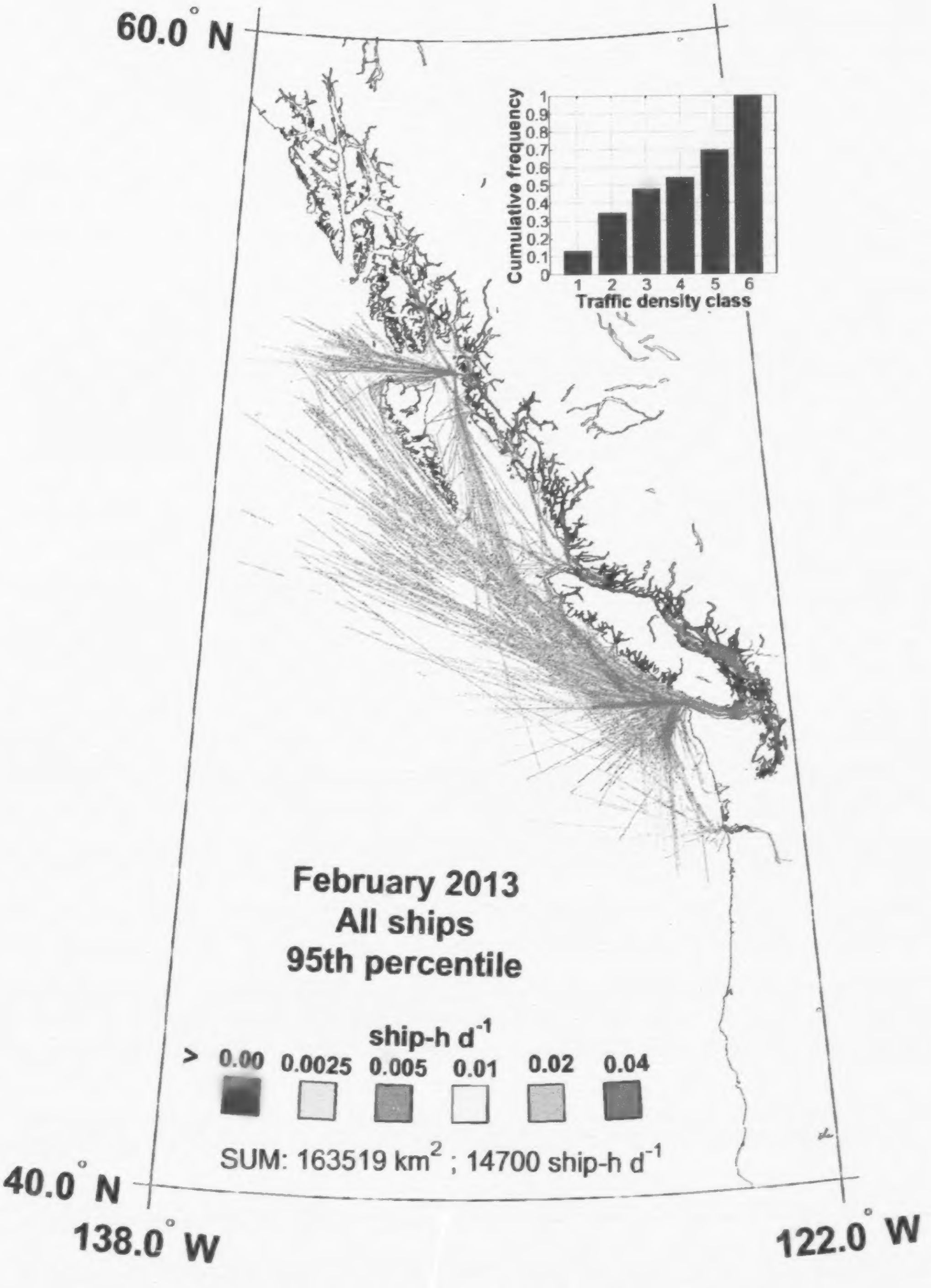

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
February 2013
All ships
95th percentile
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 163519 km² ; 14700 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 54. Map of the 95th percentile of the daily AIS traffic density of all ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

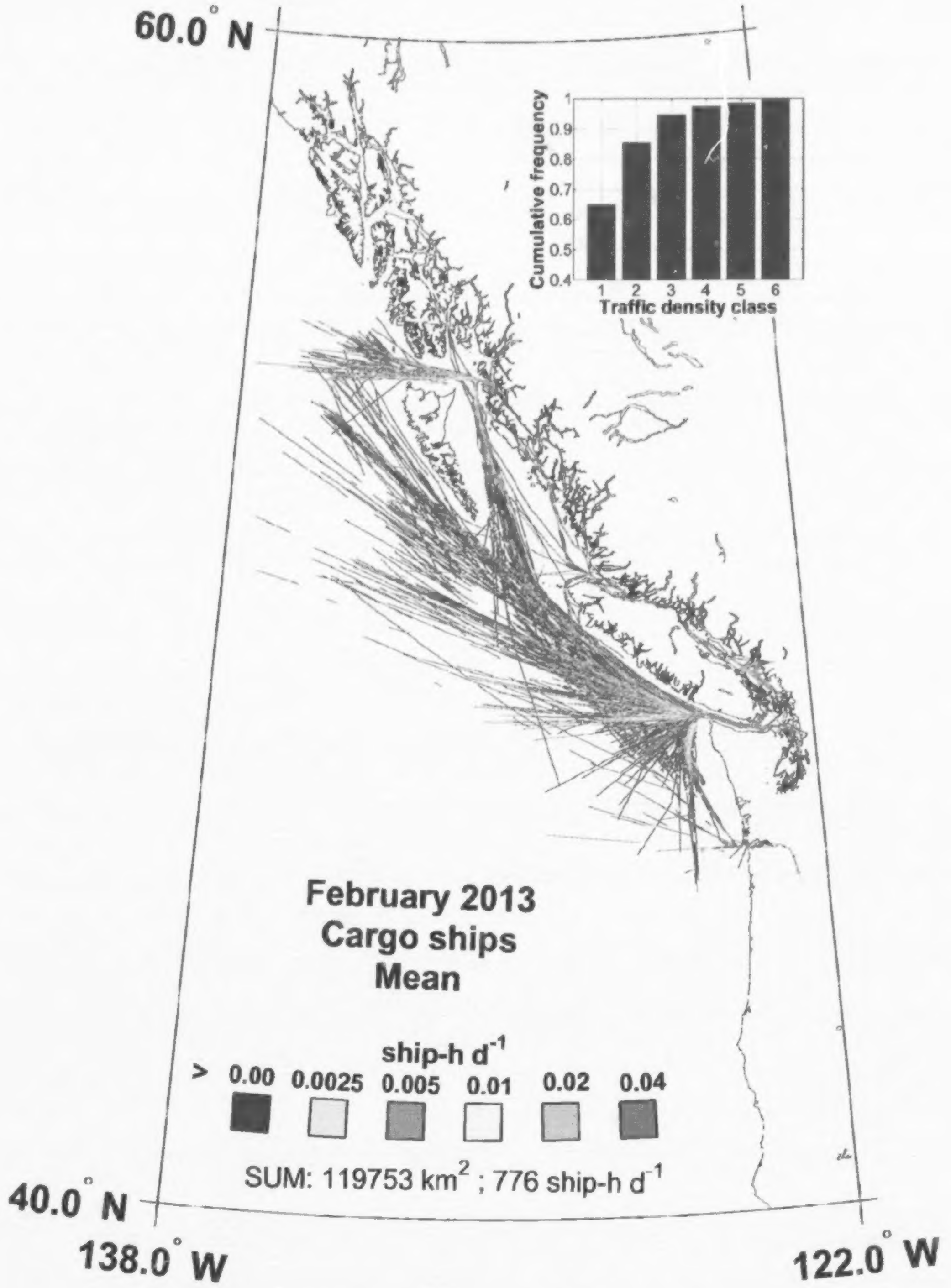

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 119753 km^2 ; 776 ship-h d^{-1}

Figure 55. Map of AIS mean traffic density of cargo-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

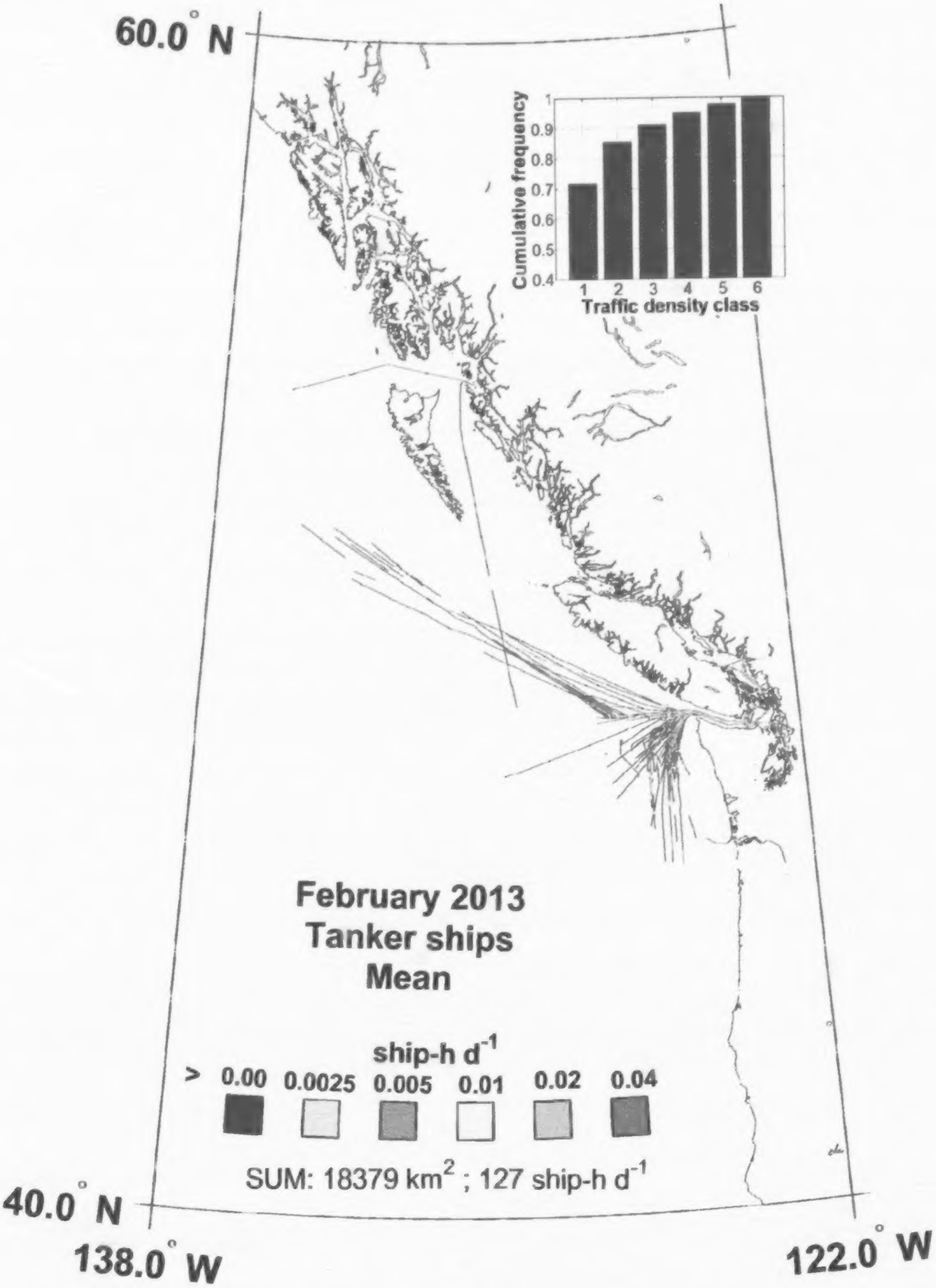

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 18379 km^2 ; 127 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 56. Map of AIS mean traffic density of tanker-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

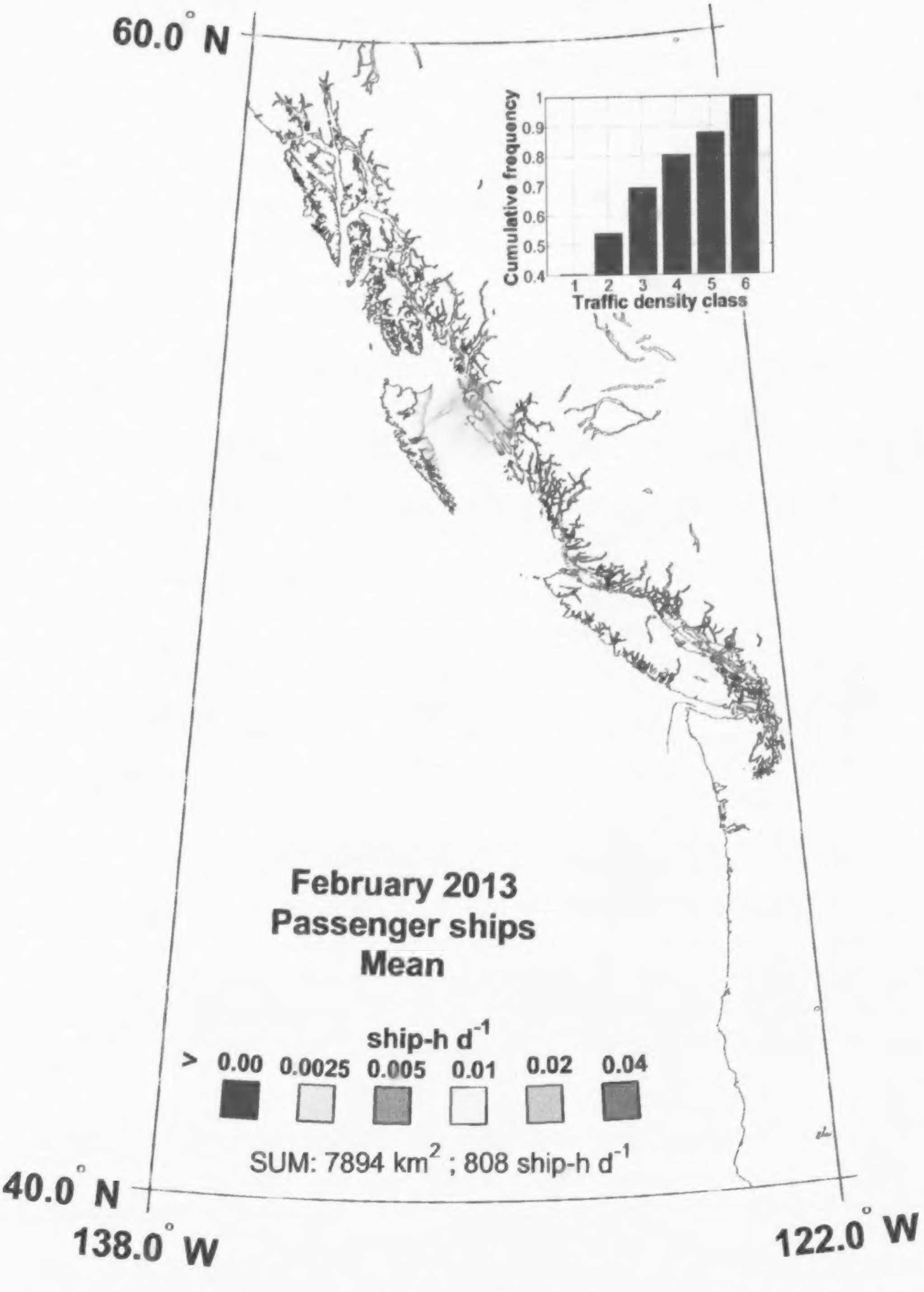

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
Passenger ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7894 km2 ; 808 ship-h d-1

Figure 57. Map of AIS mean traffic density of passenger-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

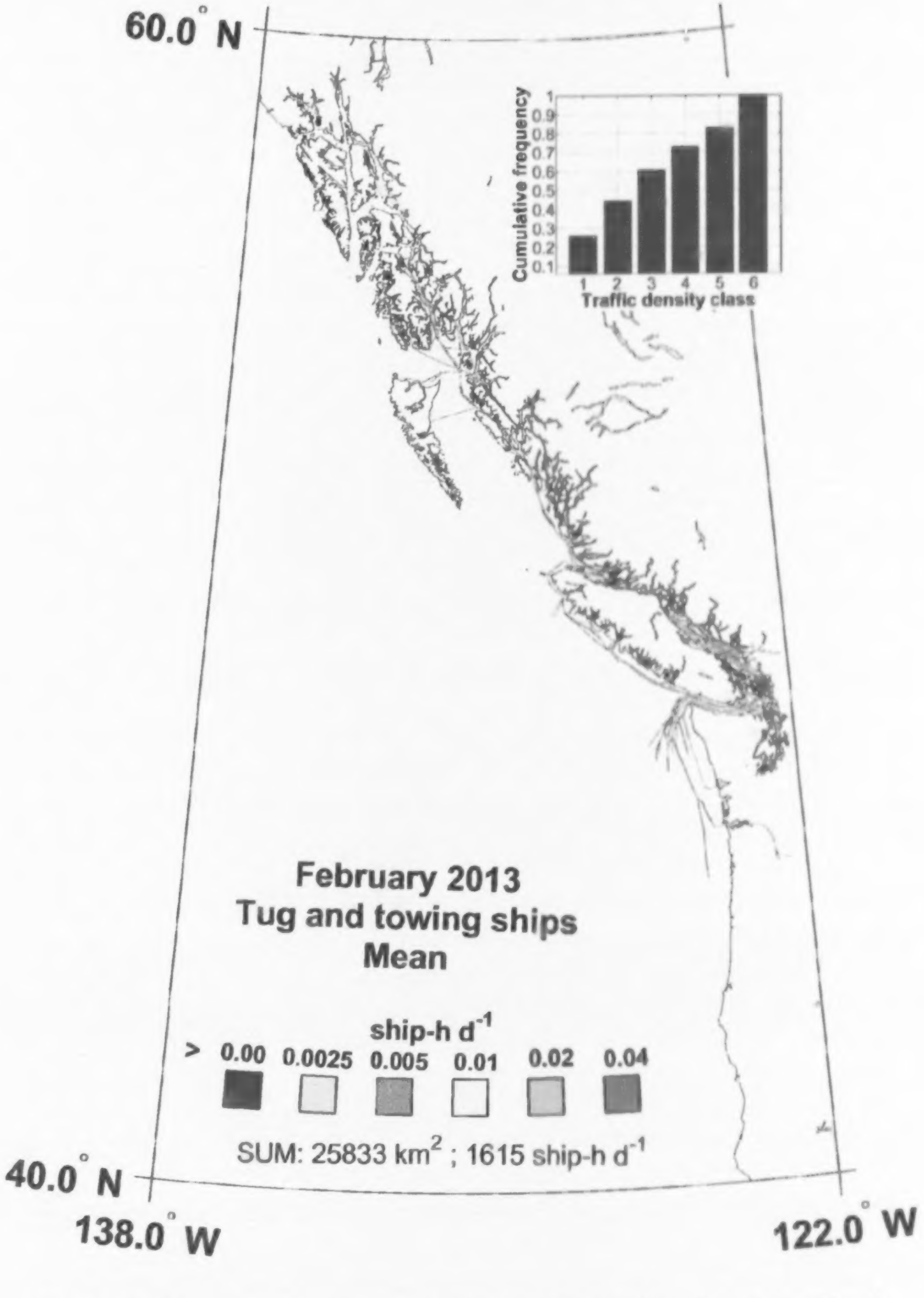

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1
2
3
4
5
6
Traffic density class
February 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 25833 km^2 ; 1615 ship-h d^{-1}

Figure 58. Map of AIS mean traffic density of tug and towing -type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

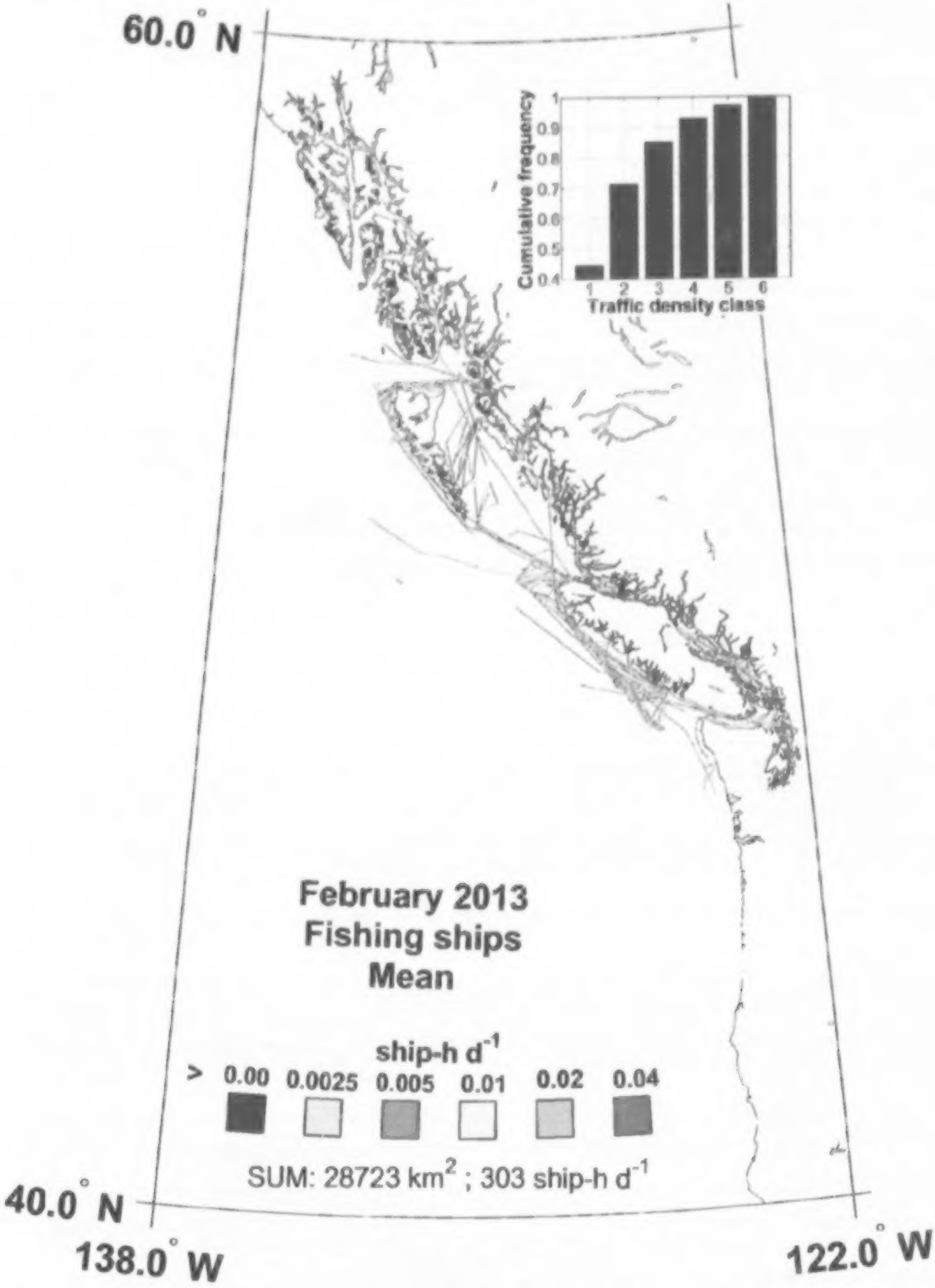

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 28723 km^2 ; 303 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 59. Map of AIS mean traffic density of fishing-type ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

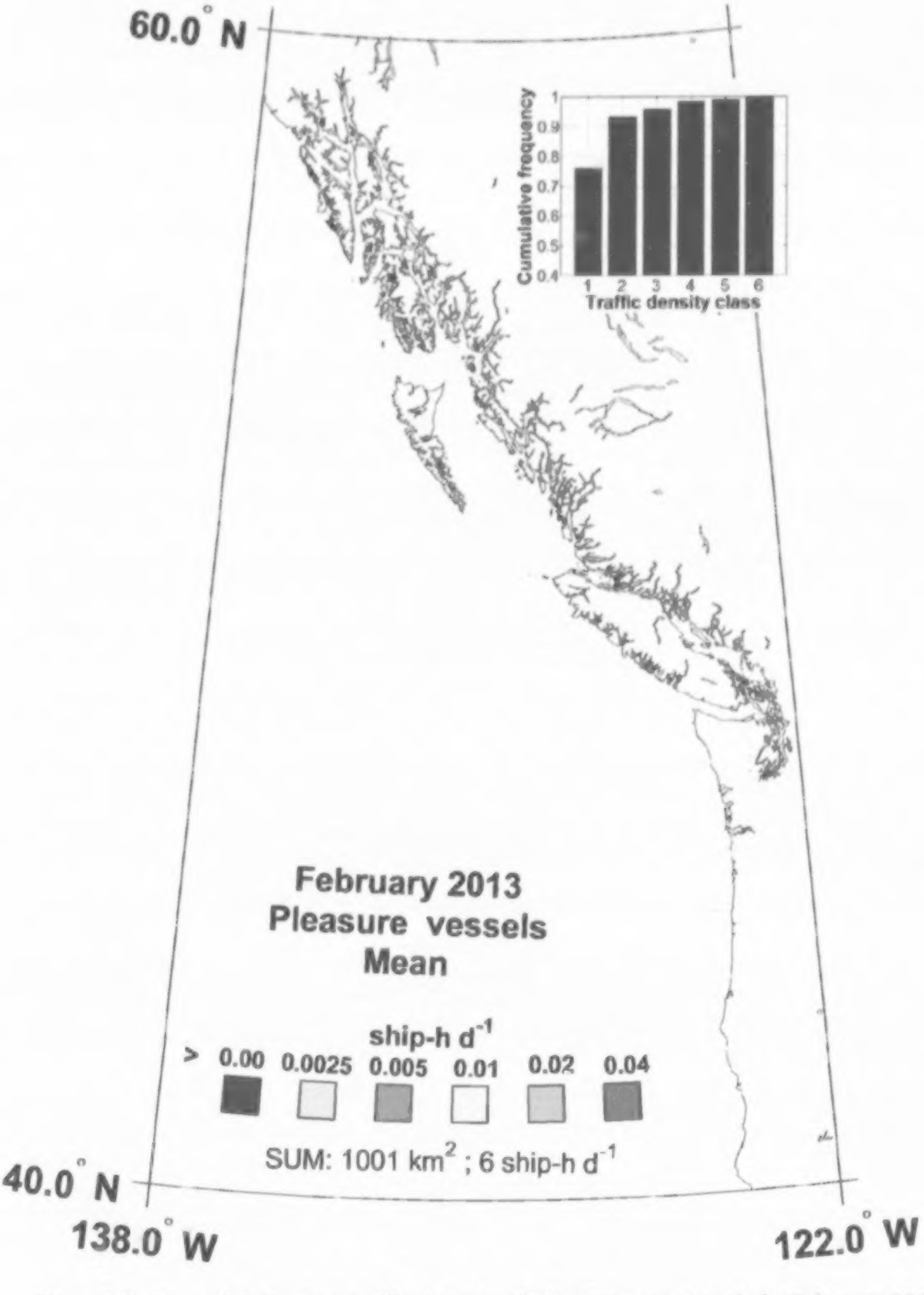

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 1001 km^2 ; 6 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 60. Map of AIS mean traffic density of pleasure-type vessels in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

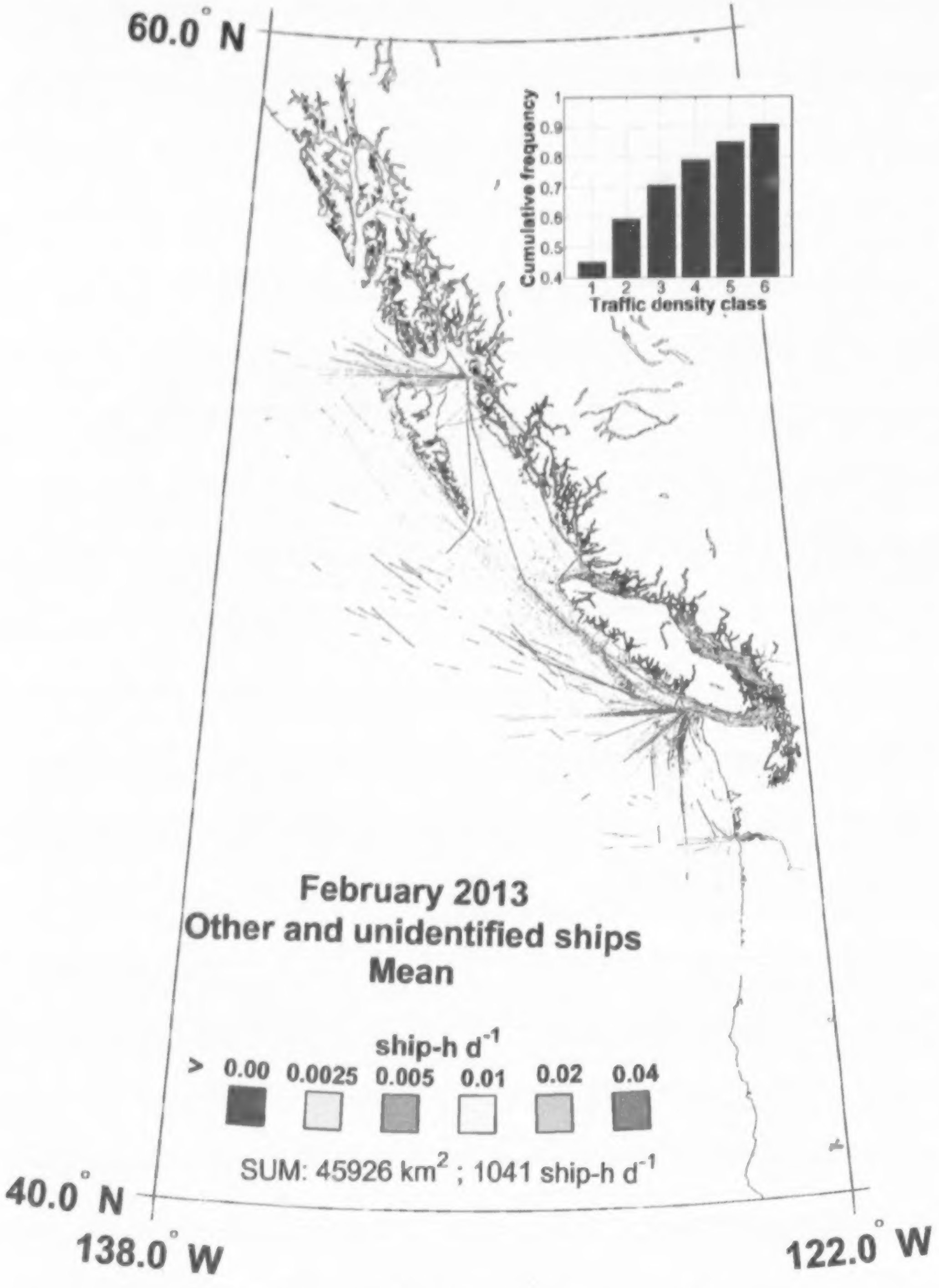

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
February 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 45926 km^2 ; 1041 ship-h d^{-1}

Figure 61. Map of AIS mean traffic density of other type of ships and ships of unidentified type in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

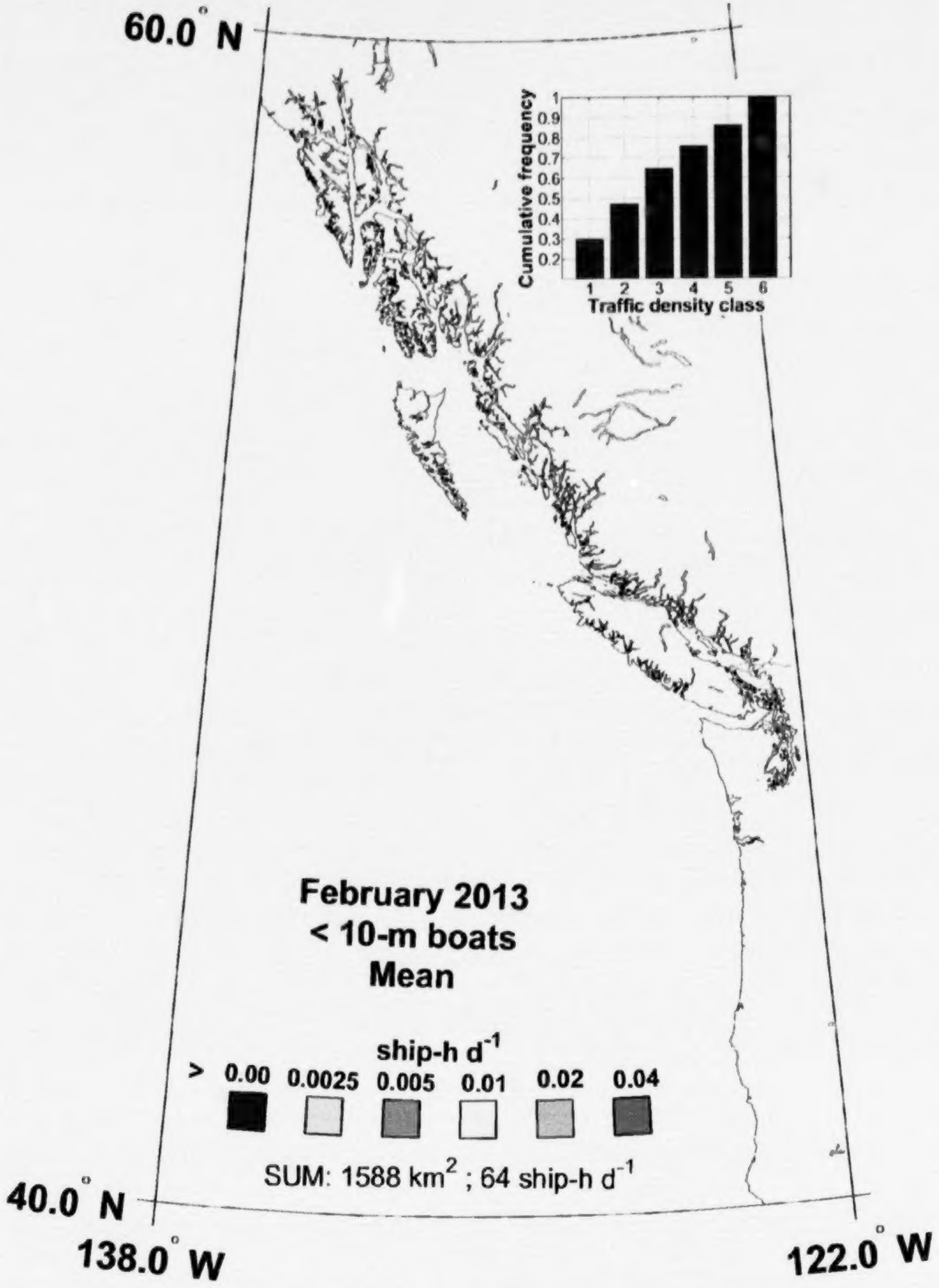

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
February 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 1588 km^2 ; 64 ship-h d^{-1}

Figure 62. Map of AIS mean traffic density of ships with lengths < 10 min February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

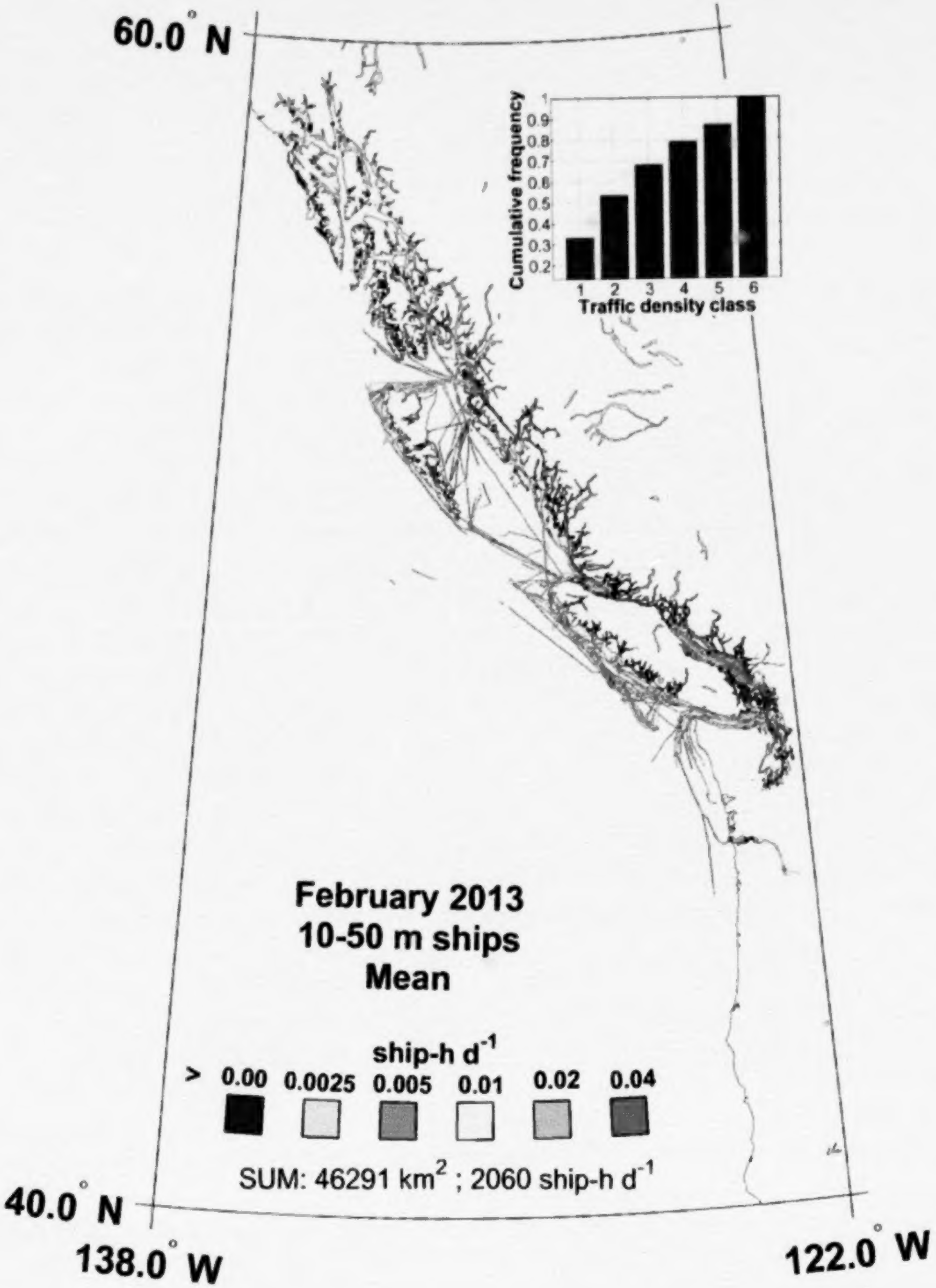

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
February 2013
10-50 m ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 46291 km2 ; 2060 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 63. Map of AIS mean traffic density of 10 to 50 m ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

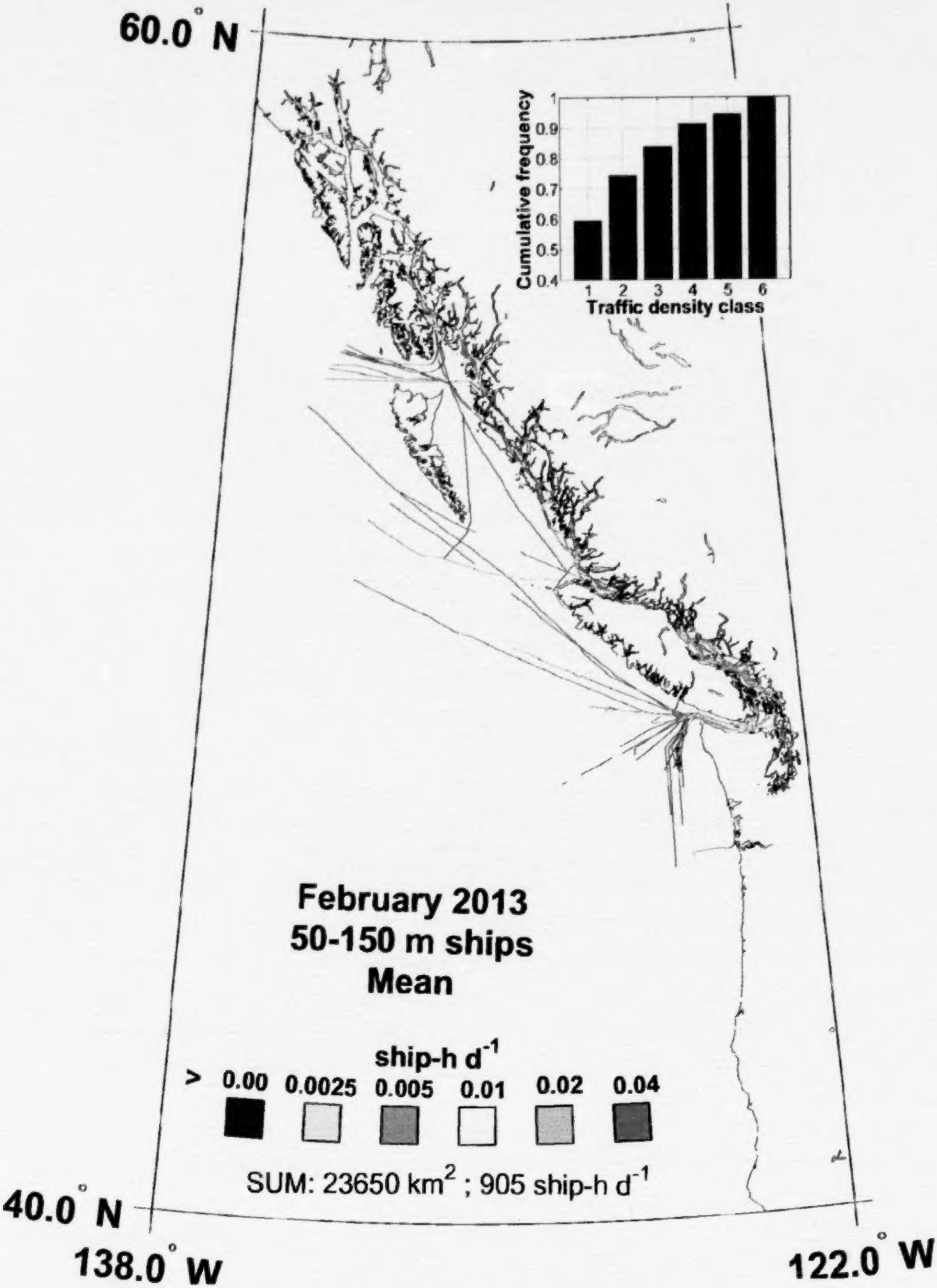

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
February 2013
50-150 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 23650 km² ; 905 ship-h d⁻¹

Figure 64. Map of 50 to 150 m ship AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

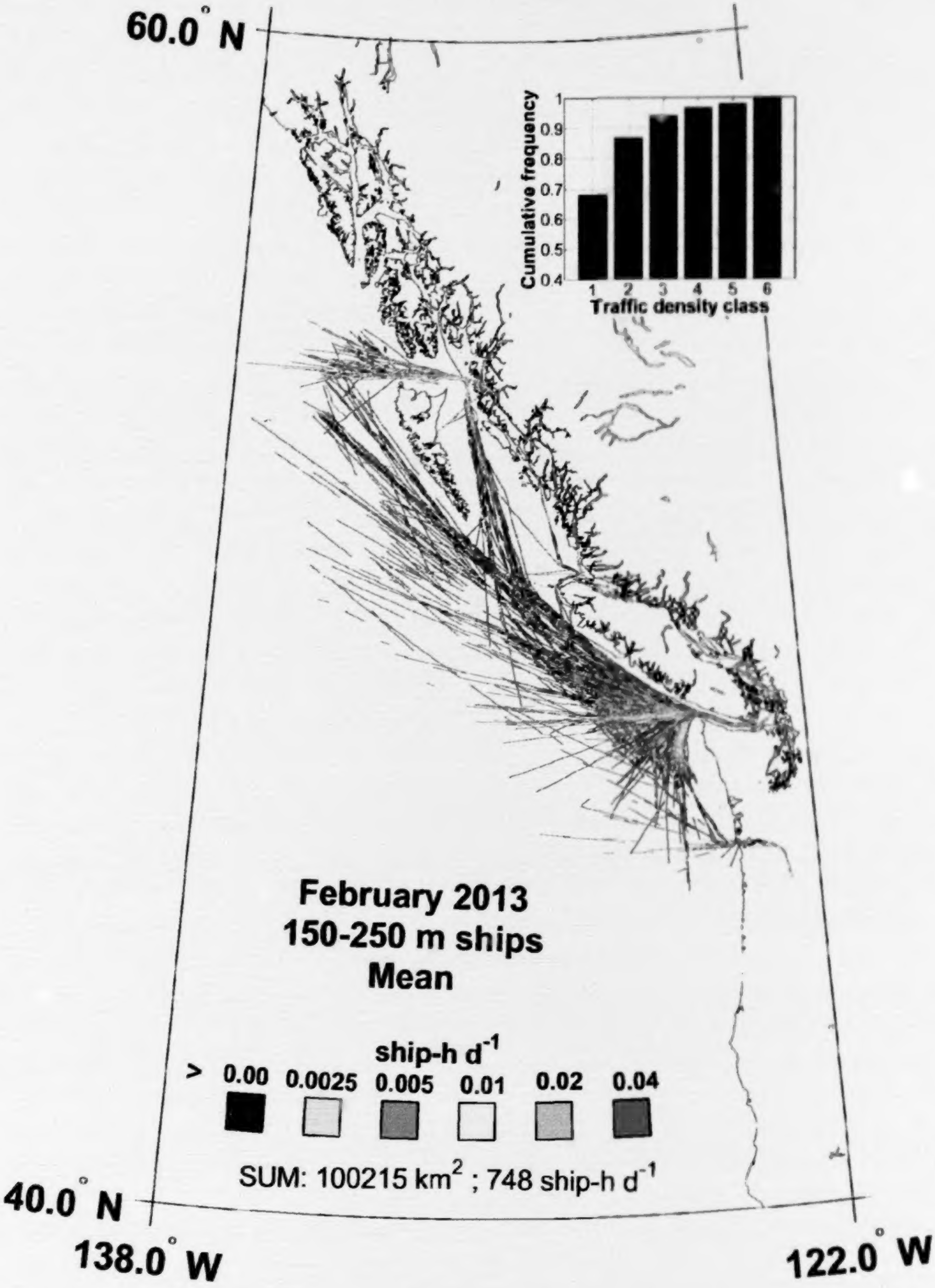

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
150-250 m ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 100215 km² ; 748 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 65. Map of AIS mean traffic density of 150 to 250 m ships in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

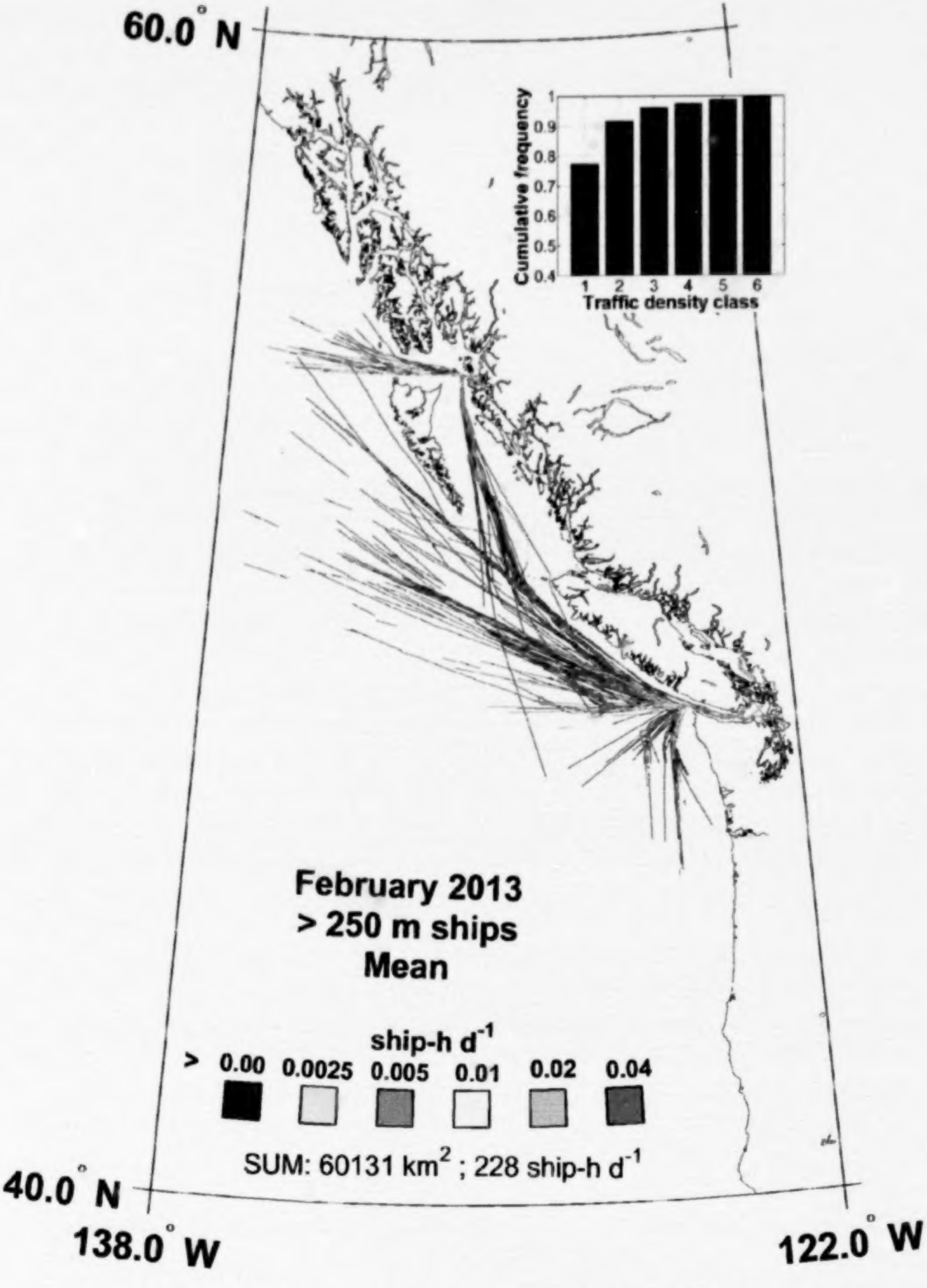

60.0° N
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
February 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 60131 km^2 ; 228 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 66. Map of >250 m ship AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

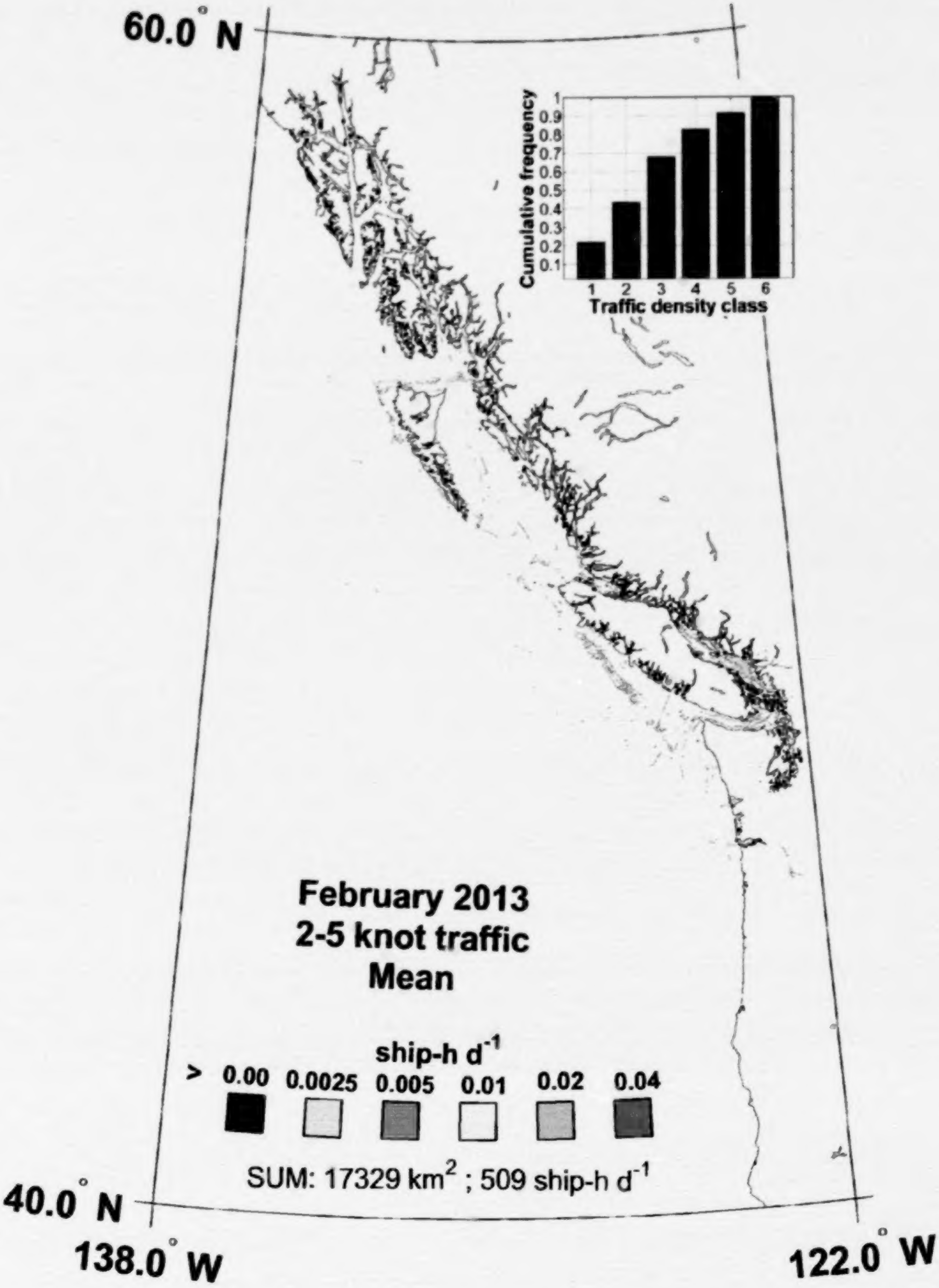

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
February 2013
2-5 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 17329 km²; 509 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 67. Map of 2–5 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

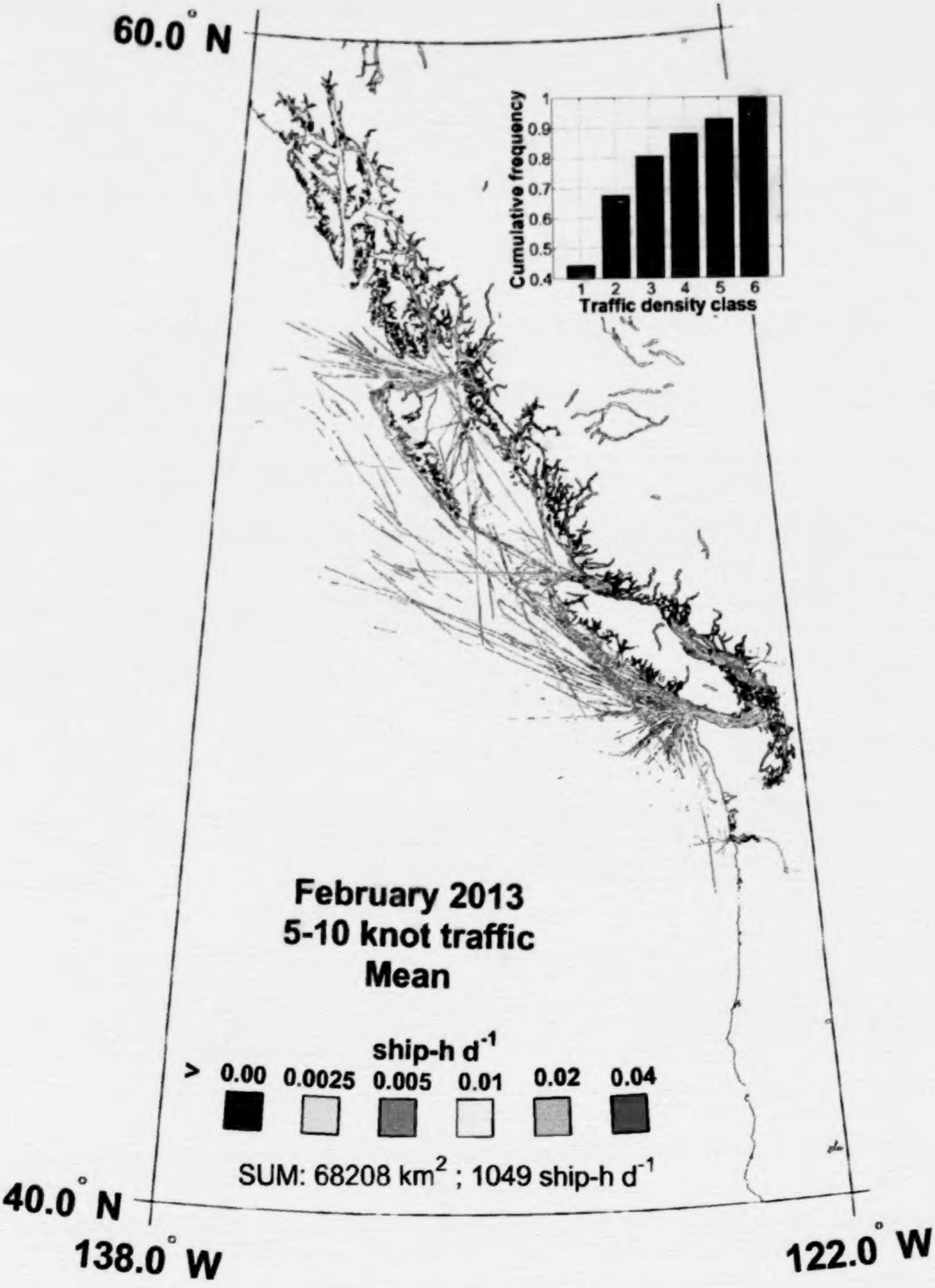

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 68208 km^2 ; 1049 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 68. Map of 5–10 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

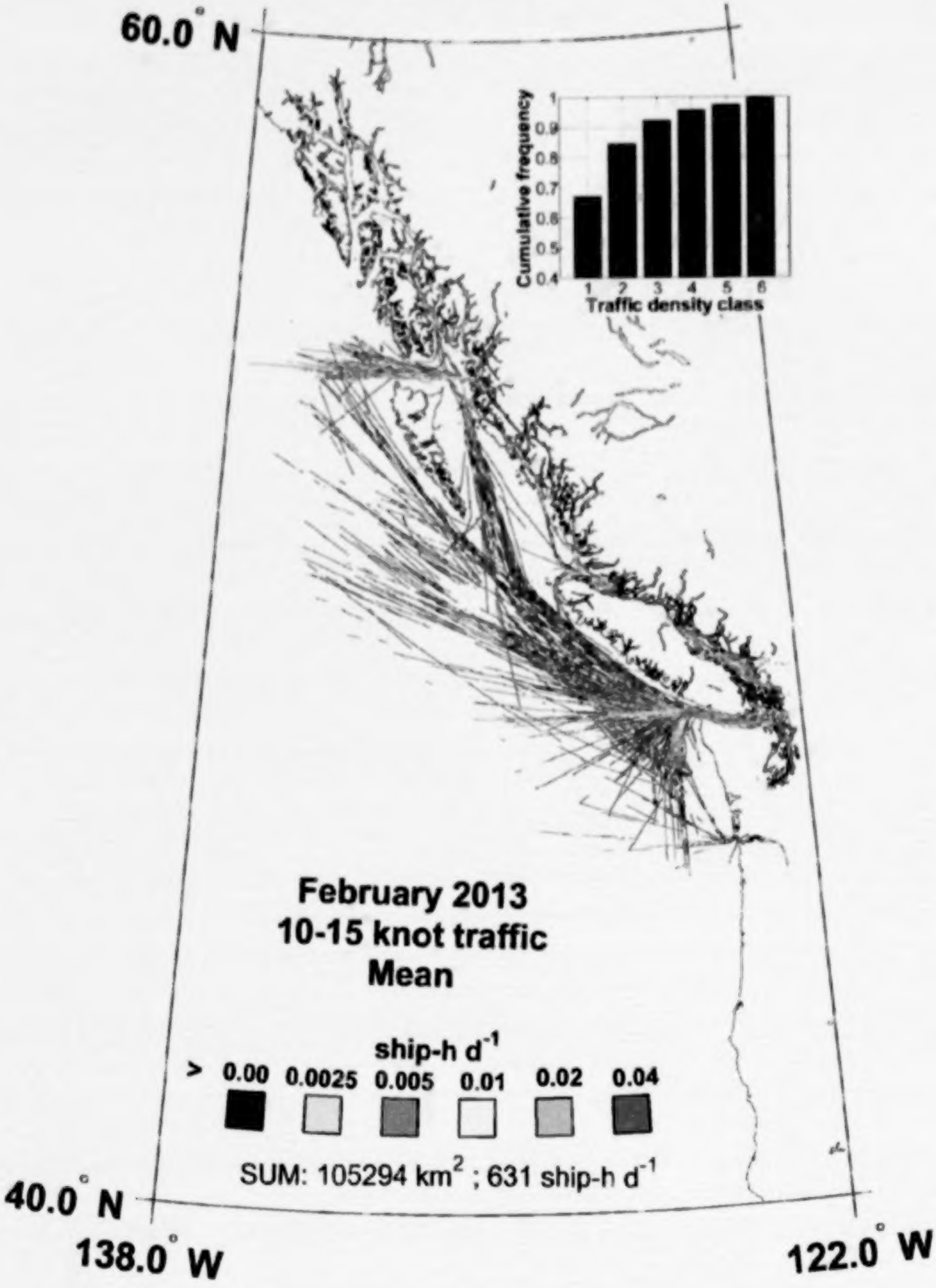

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
February 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 105294 km^2 ; 631 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 69. Map of 10–15 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

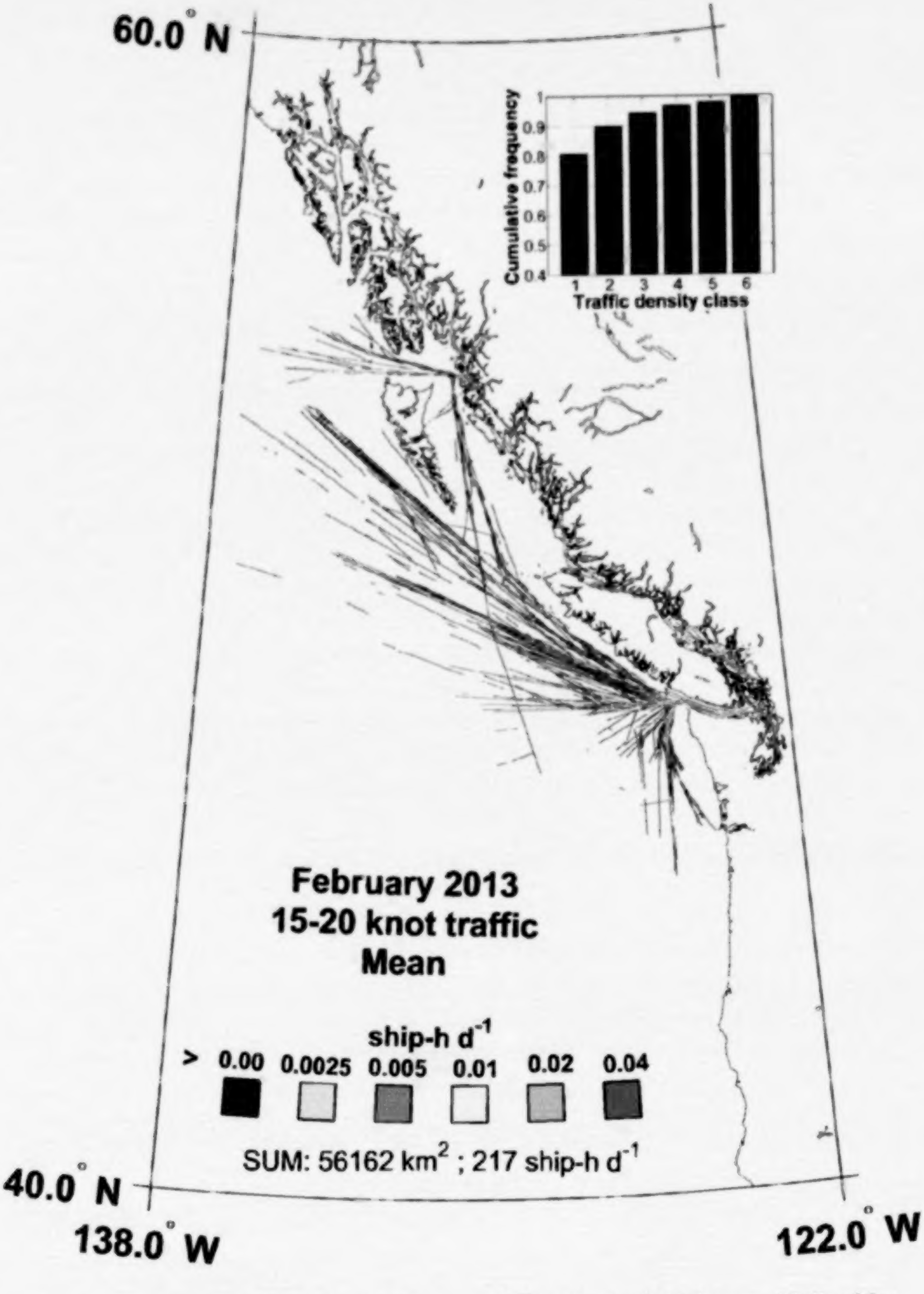

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 56162 km^2 ; 217 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 70. Map of 15–20 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

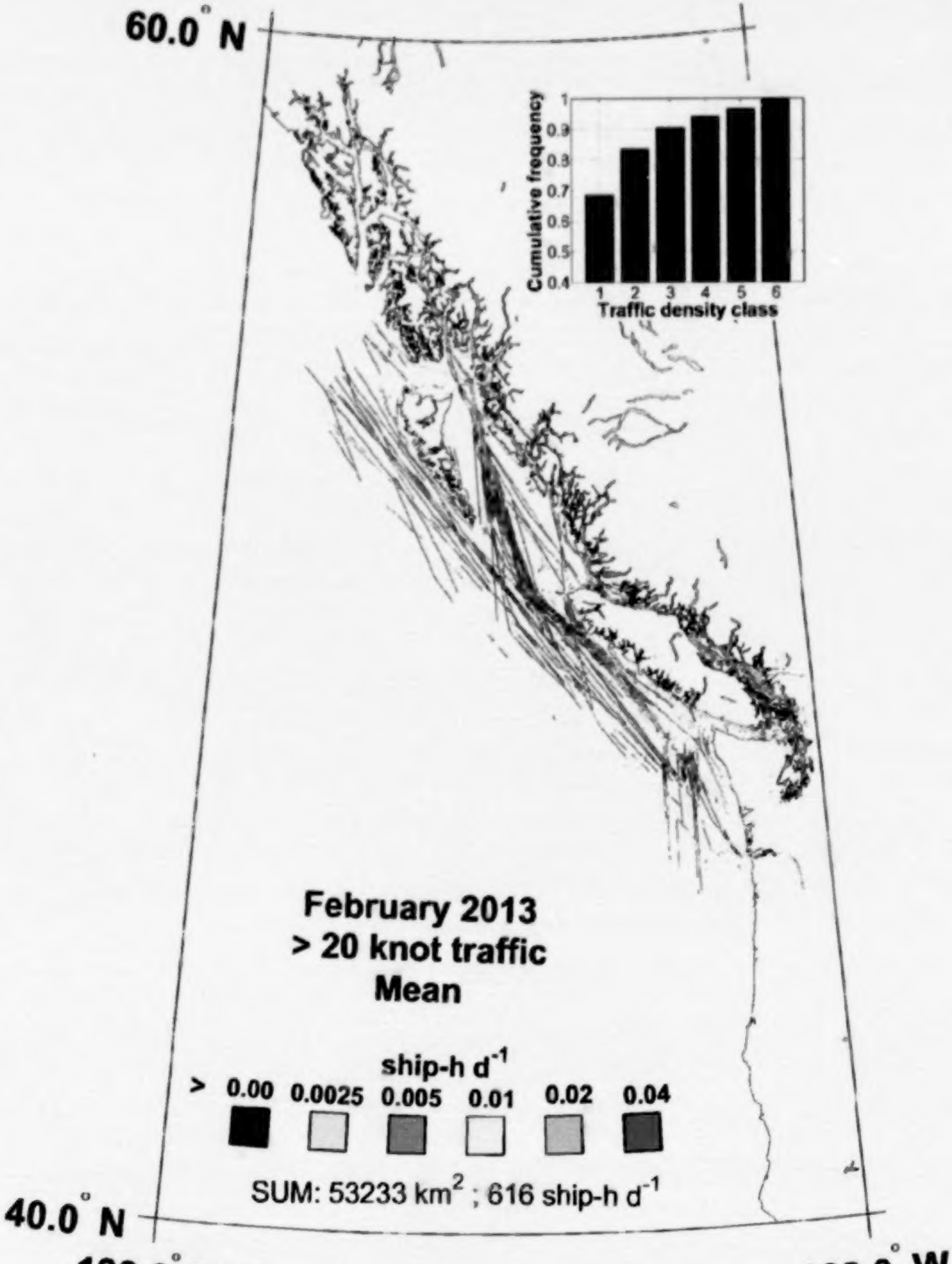

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
February 2013
> 20 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 53233 km2 ; 616 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 71. Map of >20 knot AIS mean traffic density in February 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.3. March 2013

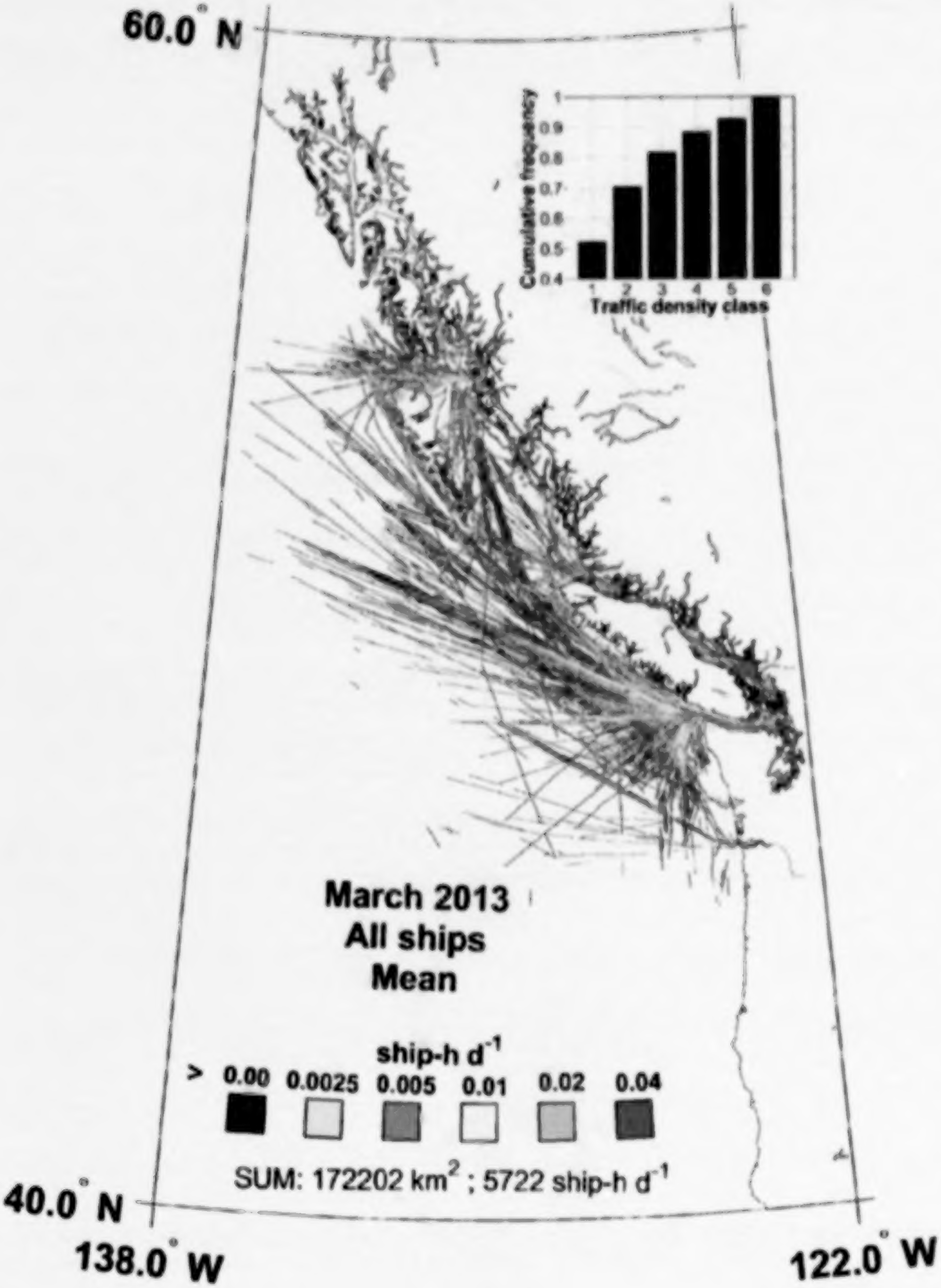

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
March 2013
All ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 172202 km^2 ; 5722 ship-h d^{-1}

Figure 72. Map of AIS mean traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

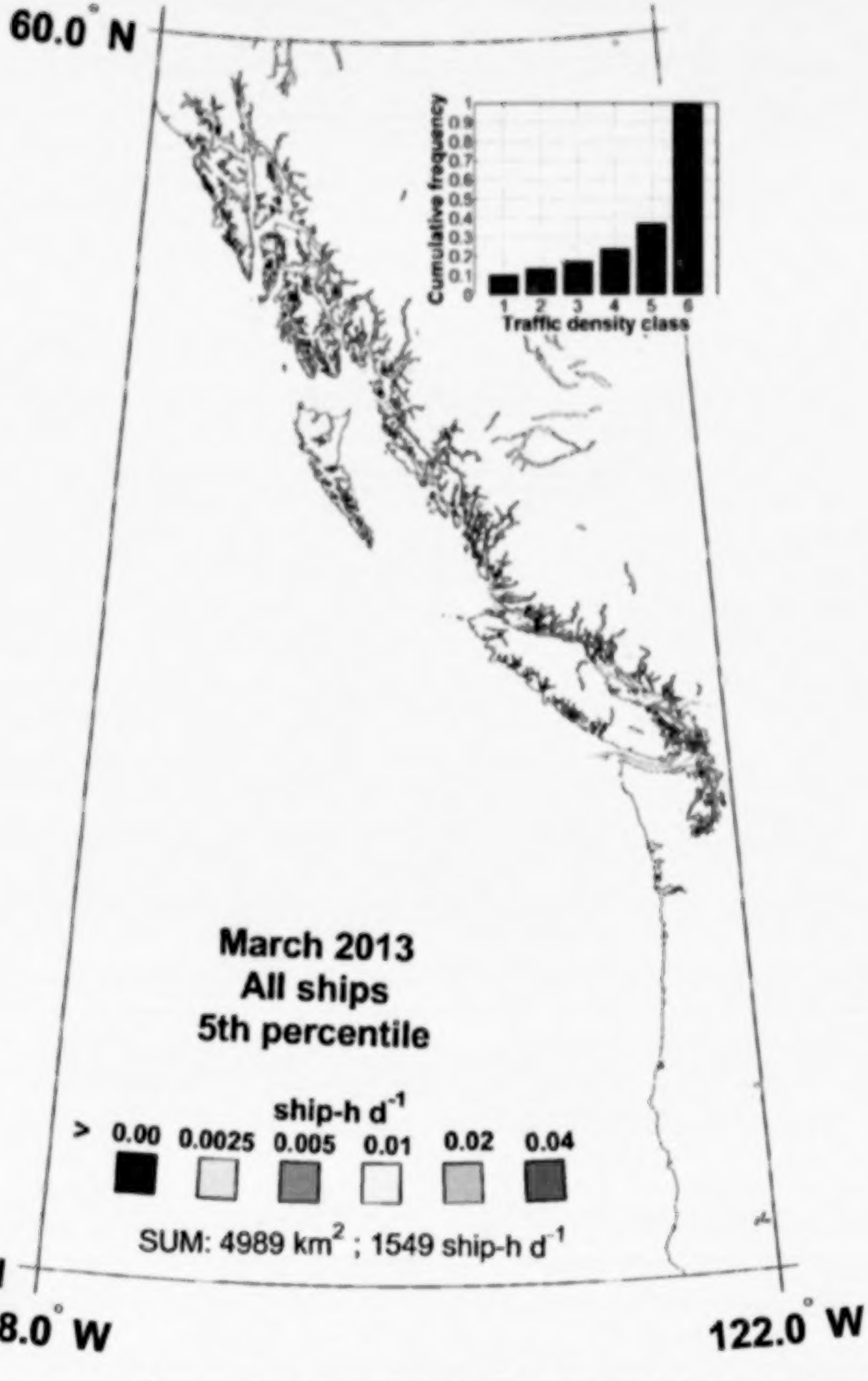

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
March 2013
All ships
5th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 4989 km² ; 1549 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 73. Map of the 5th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

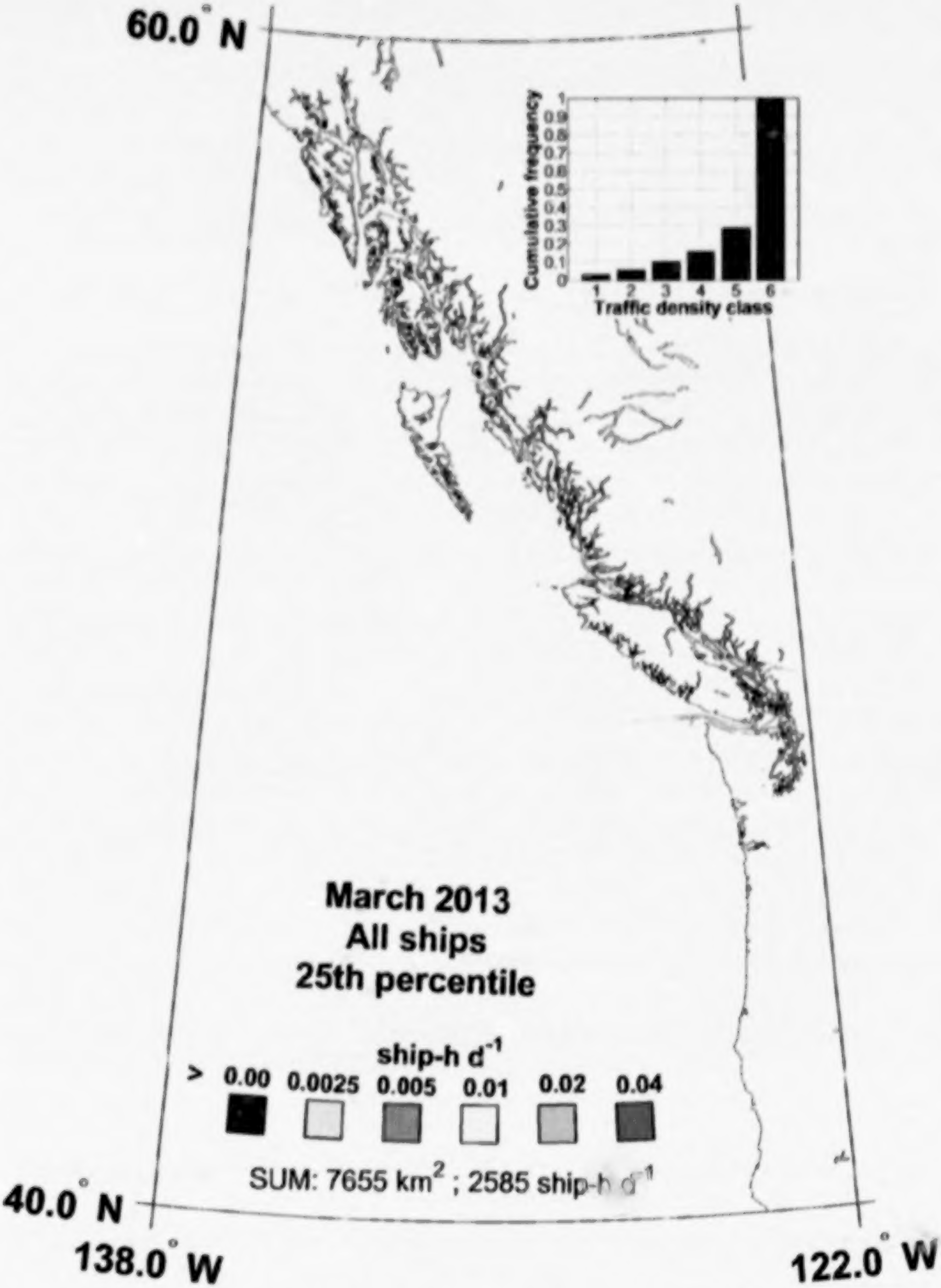

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
March 2013
All ships
25th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 7655 km² ; 2585 ship-h d⁻¹

Figure 74. Map of the 25th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

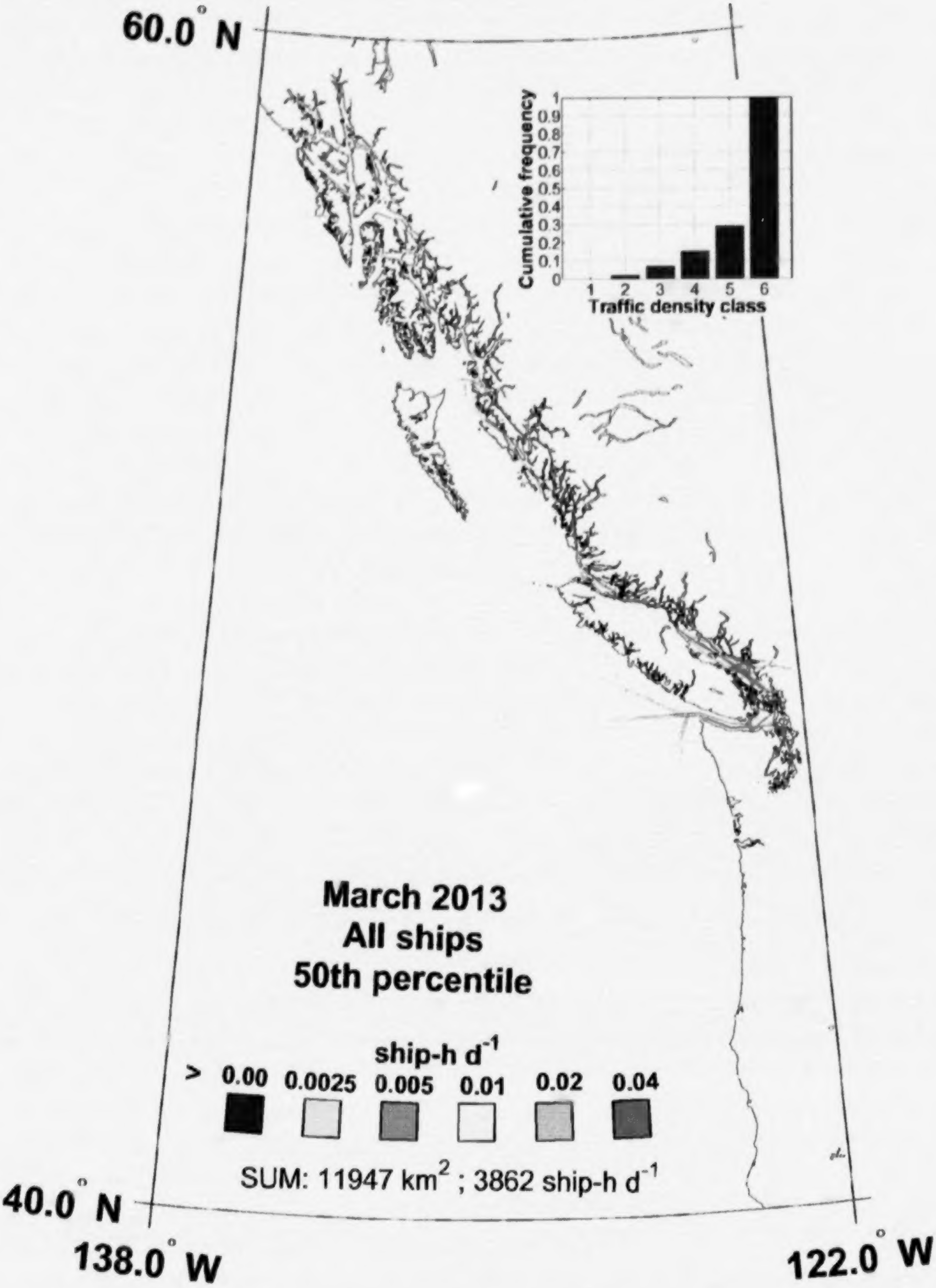

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
March 2013
All ships
50th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 11947 km^2 ; 3862 ship-h d^{-1}

Figure 75. Map of the 50th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

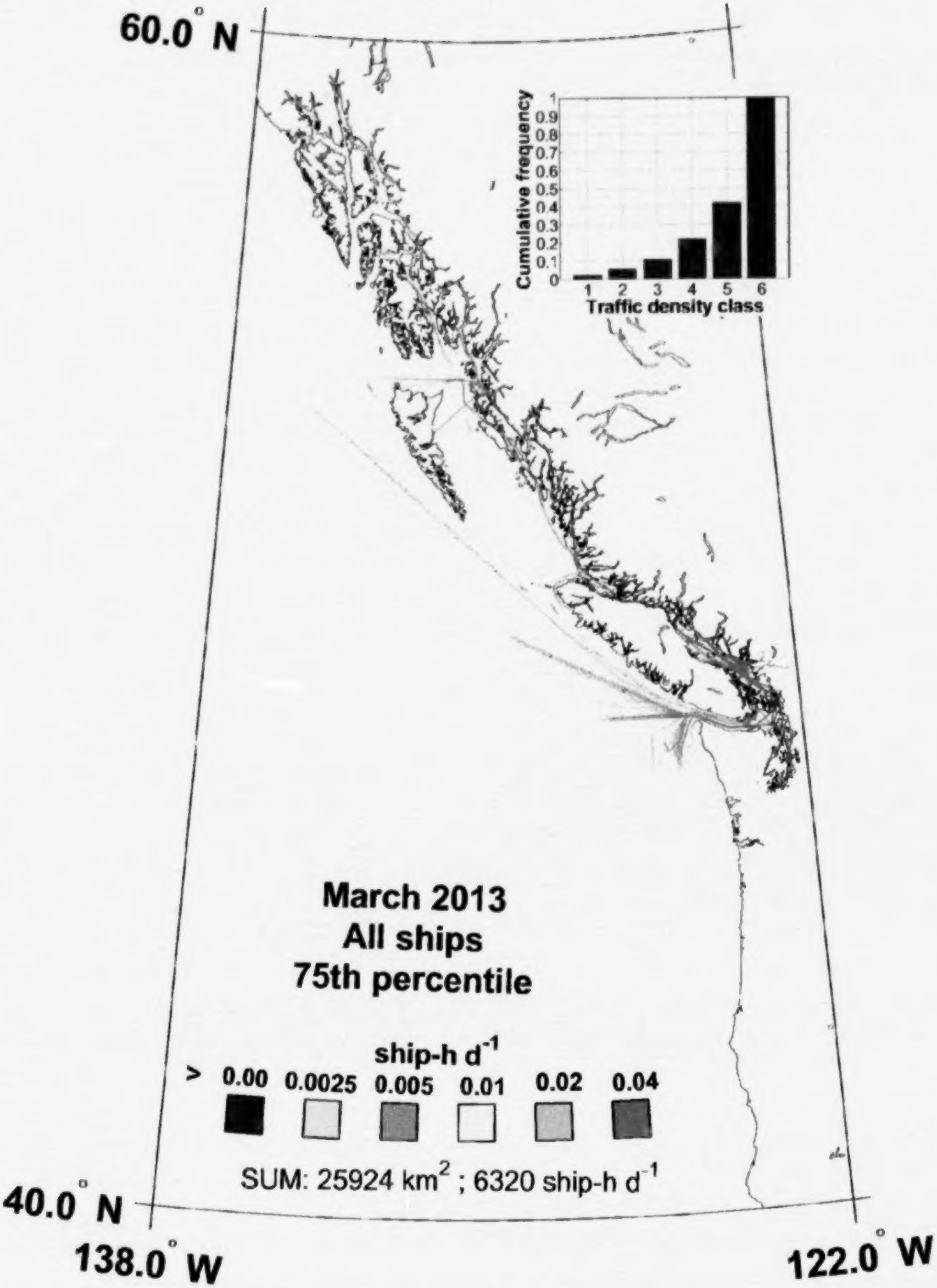

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
March 2013
All ships
75th percentile
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 25924 km² ; 6320 ship-h d⁻¹

Figure 76. Map of the 75th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

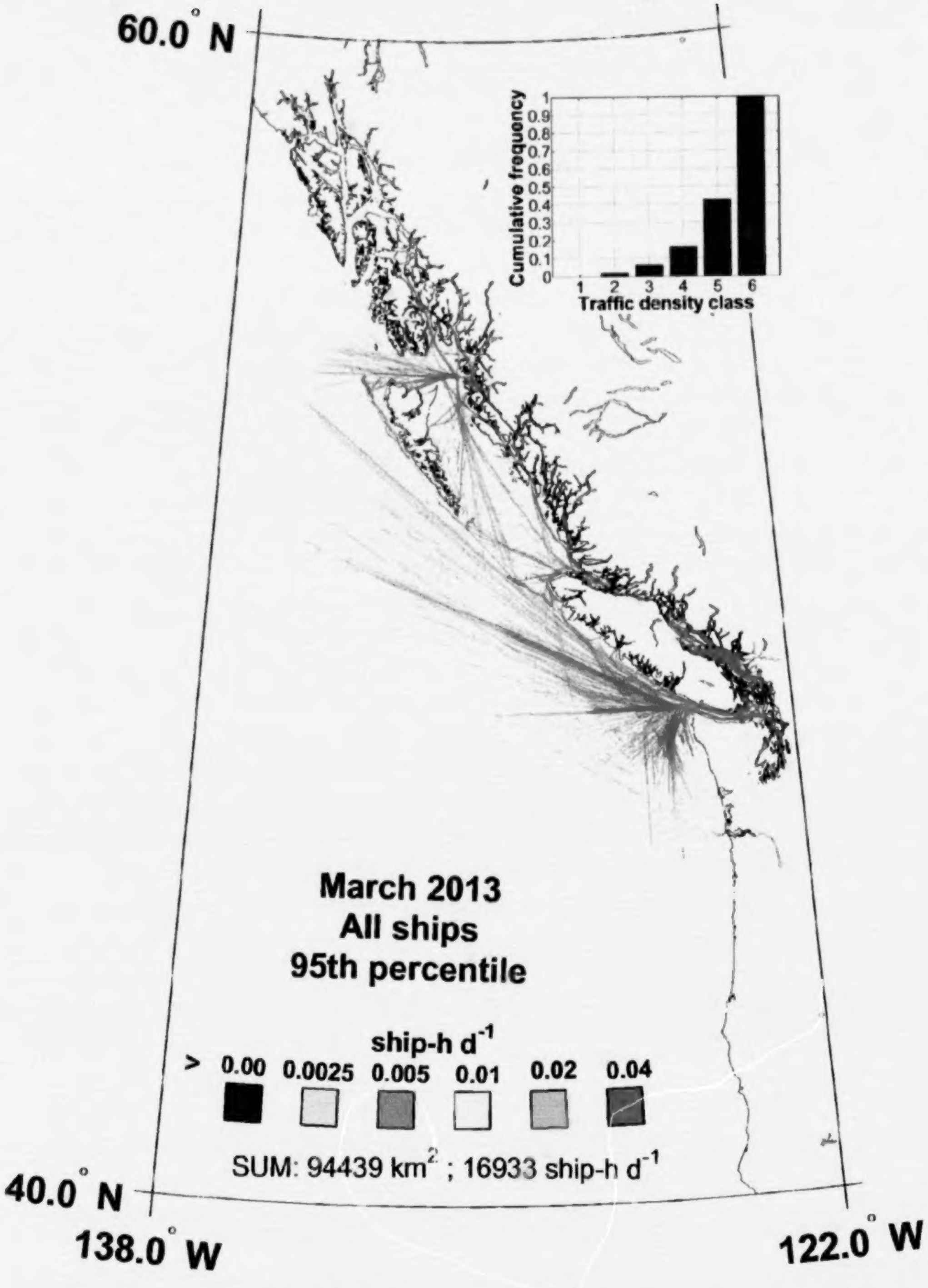

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
March 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 94439 km^2 ; 16933 ship-h d^{-1}

Figure 77. Map of the 95th percentile of the daily AIS traffic density of all ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

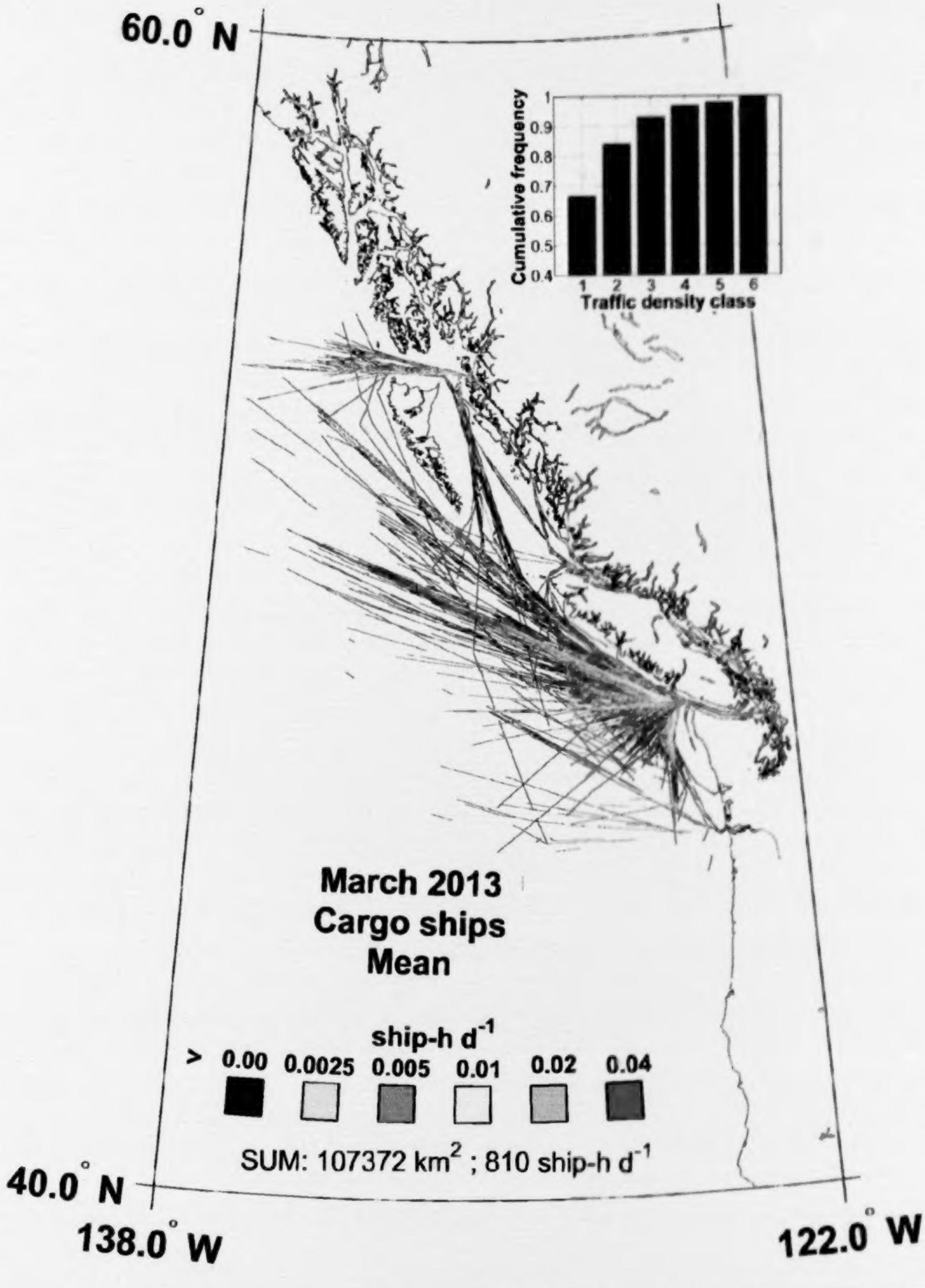

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
Traffic density class
1
2
3
4
5
6
March 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 107372 km^2 ; 810 ship-h d^{-1}

Figure 78. Map of AIS mean traffic density of cargo-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

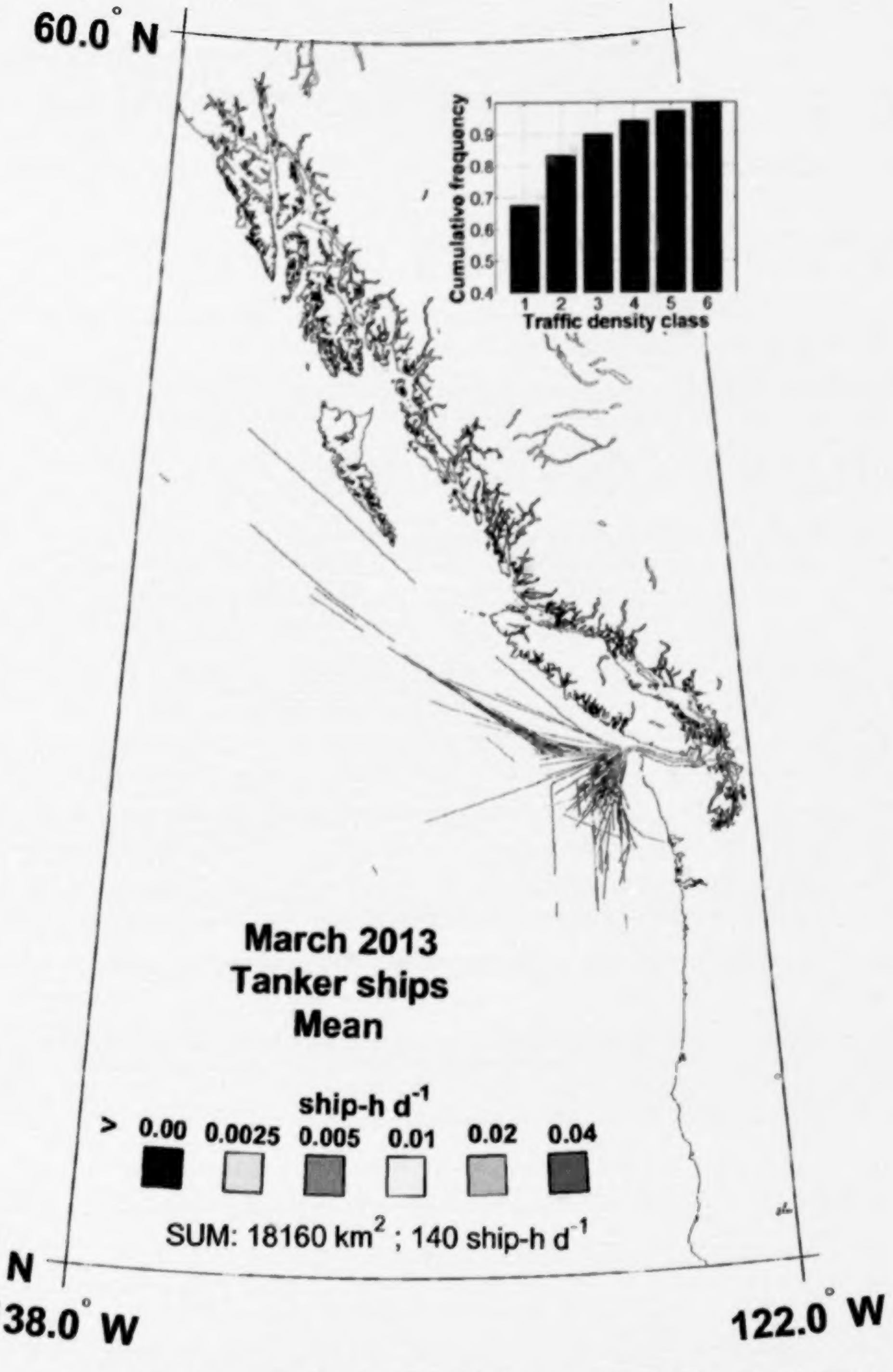

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 18160 km^2 ; 140 ship-h d^{-1}

Figure 79. Map of AIS mean traffic density of tanker-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

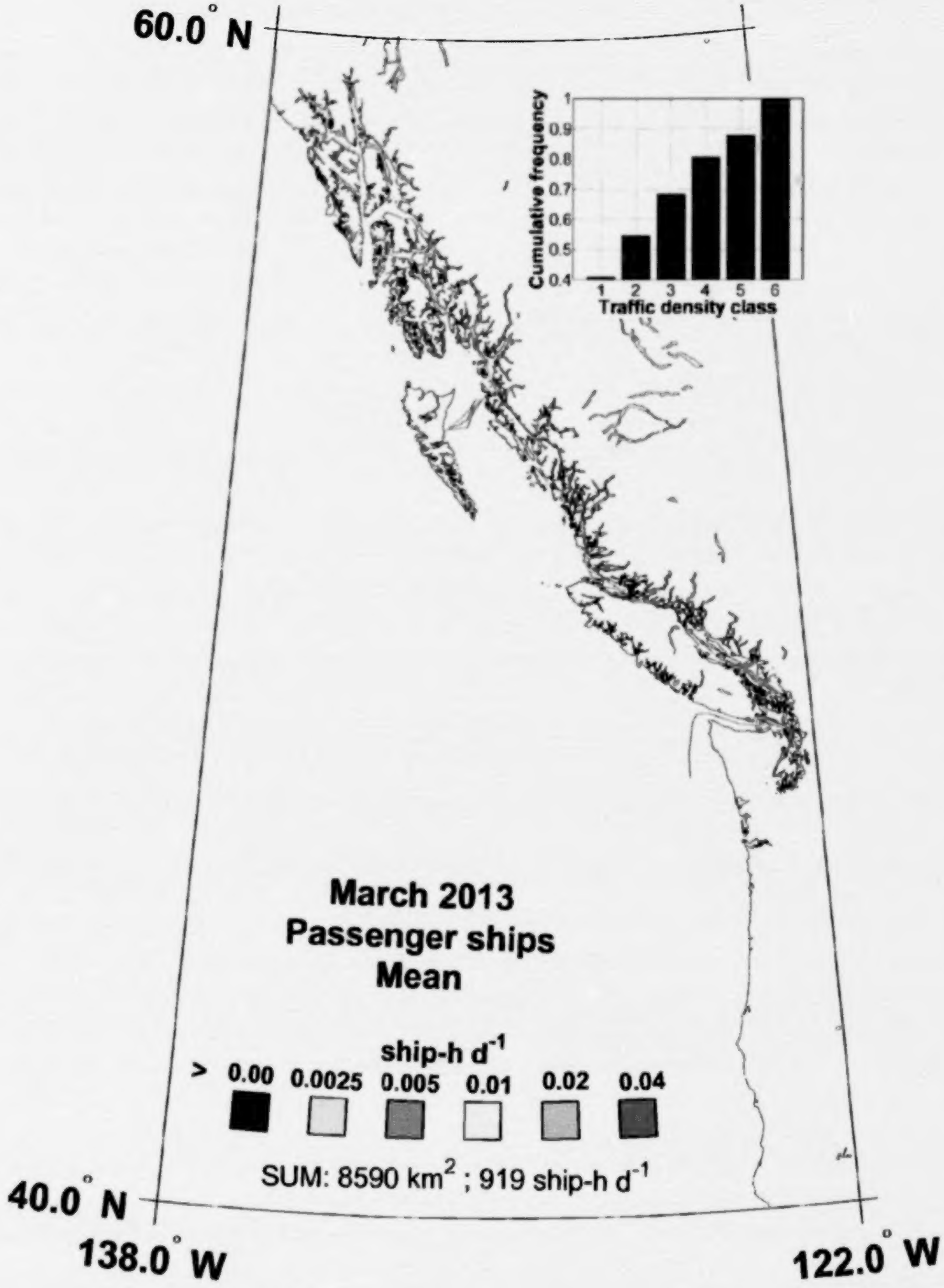

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
March 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 8590 km^2 ; 919 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 80. Map of AIS mean traffic density of passenger-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

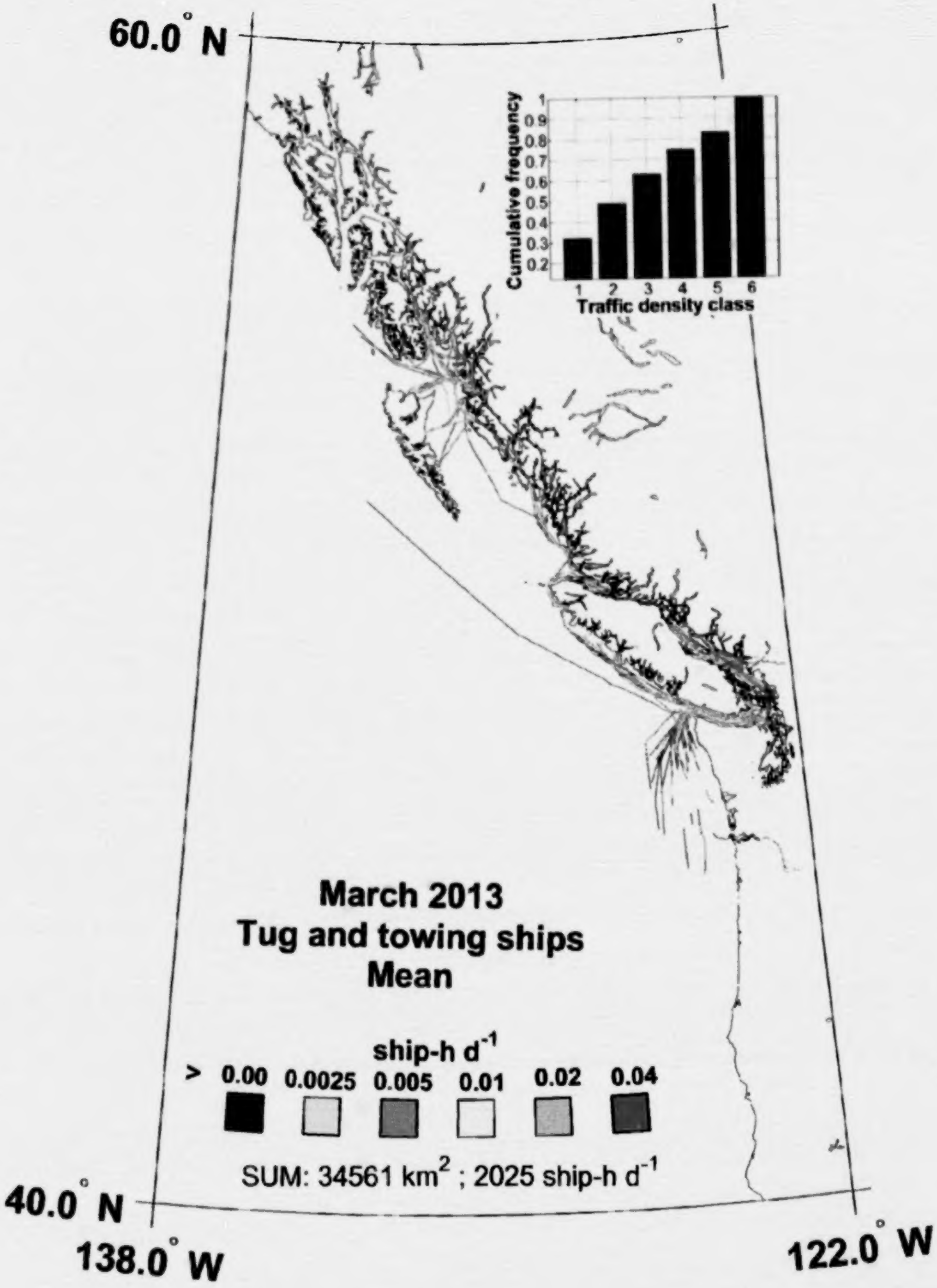

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
March 2013
Tug and towing ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 34561 km2 ; 2025 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 81. Map of AIS mean traffic density of tug and towing -type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

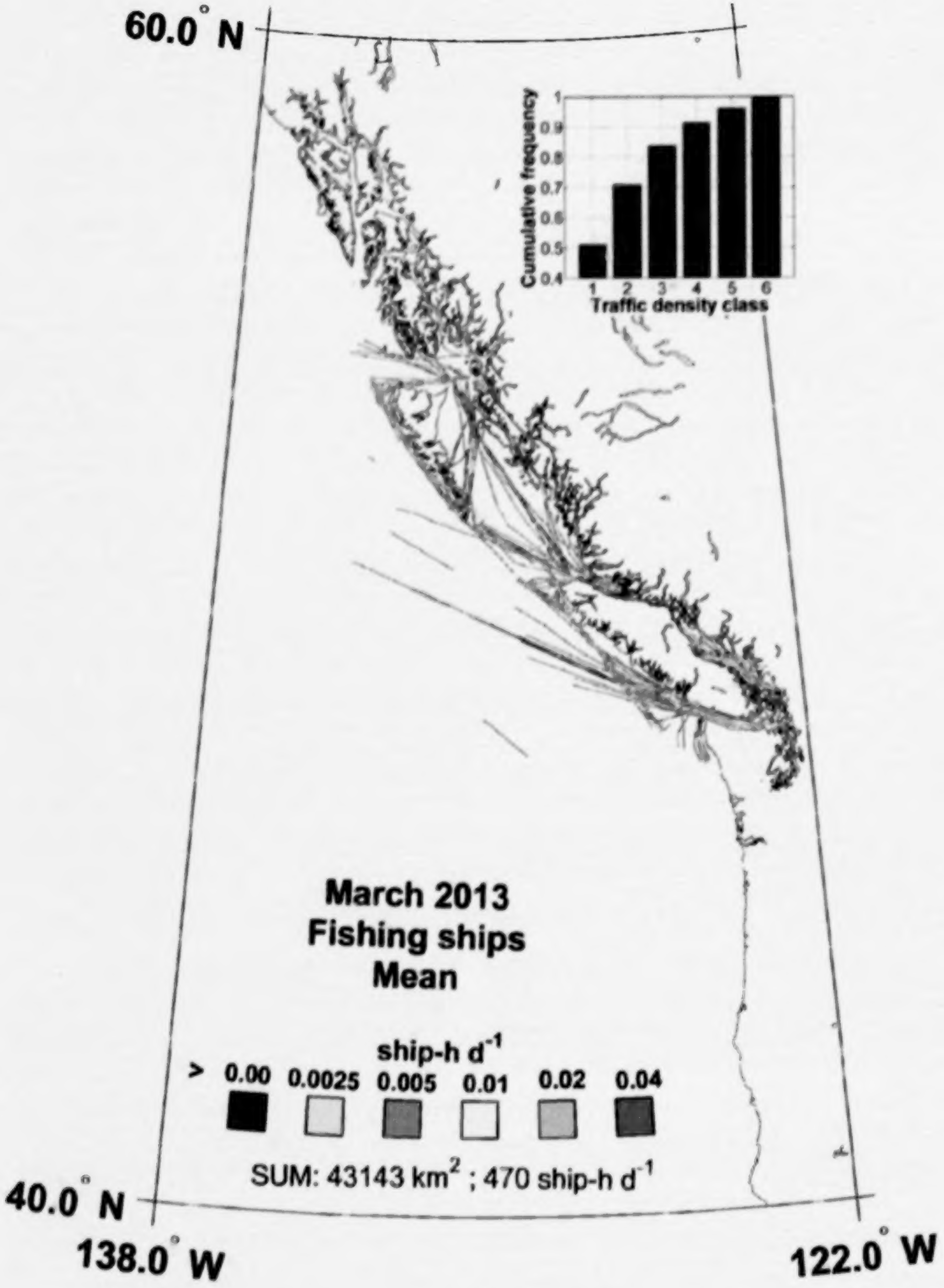

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
Fishing ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 43143 km² ; 470 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 82. Map of AIS mean traffic density of fishing-type ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

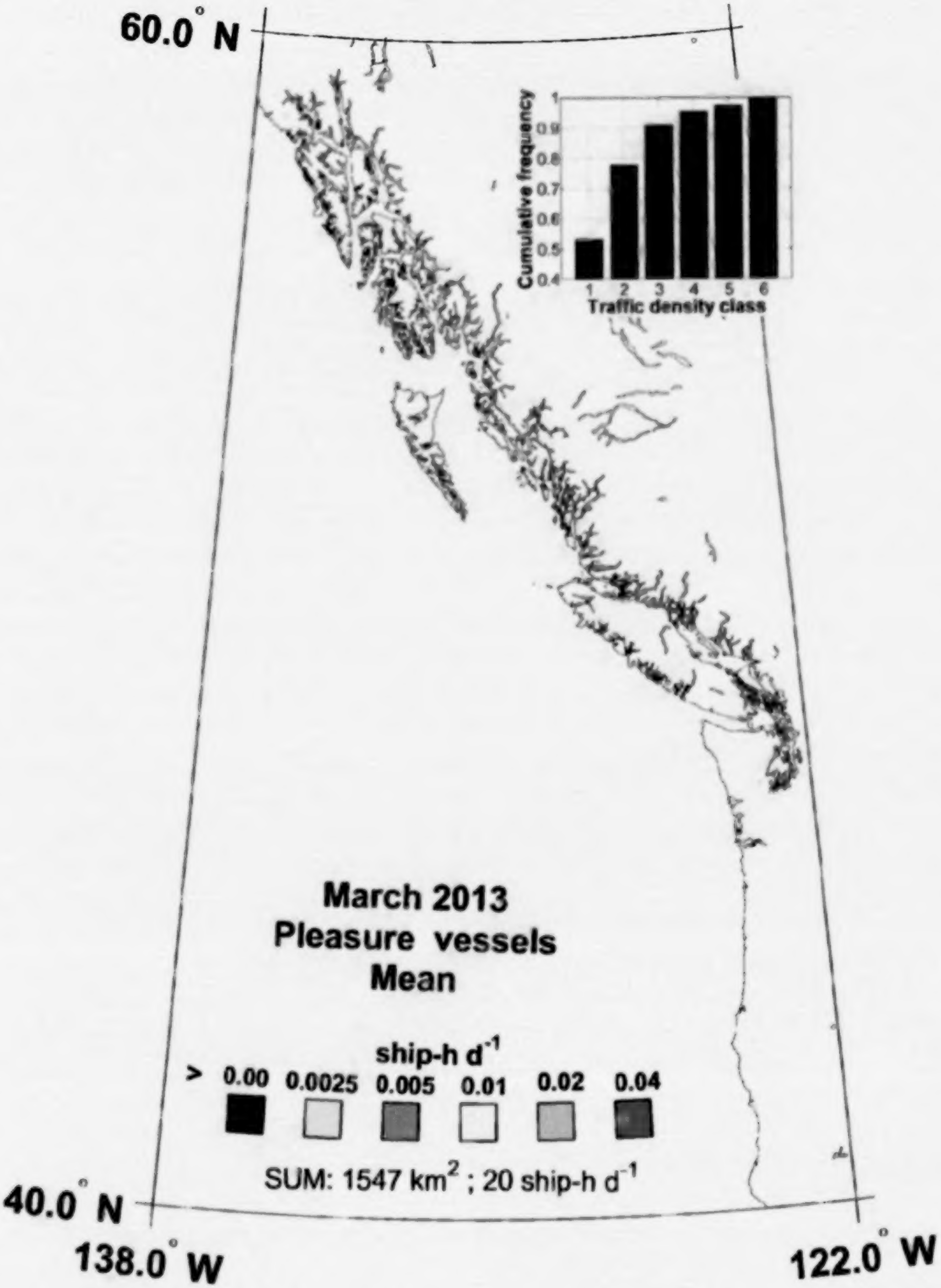

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 1547 km^2 ; 20 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 83. Map of AIS mean traffic density of pleasure-type vessels in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

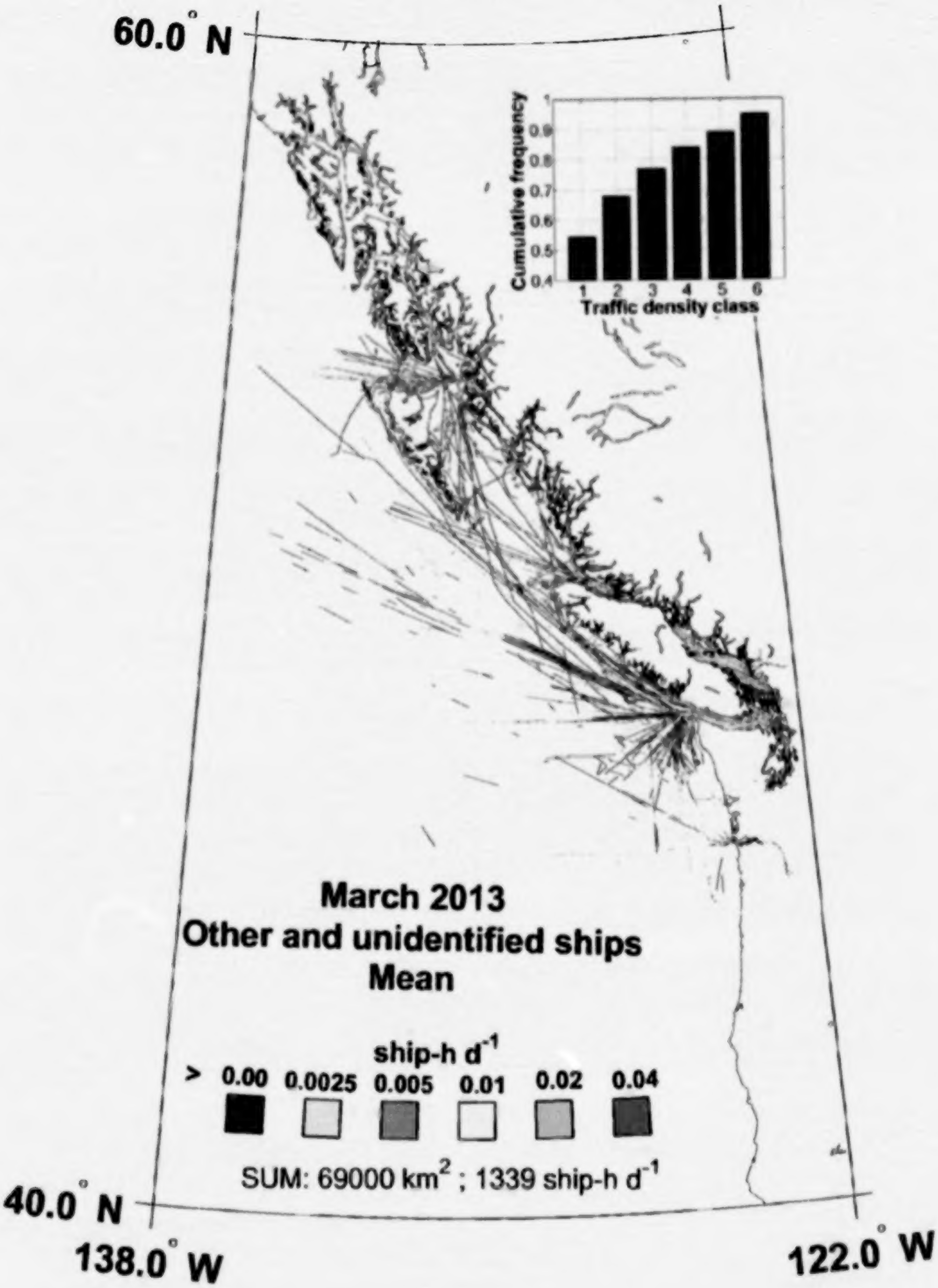

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
March 2013
Other and unidentified ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 69000 km2 ; 1339 ship-h d-1

Figure 84. Map of AIS mean traffic density of other type of ships and ships of unidentified type in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

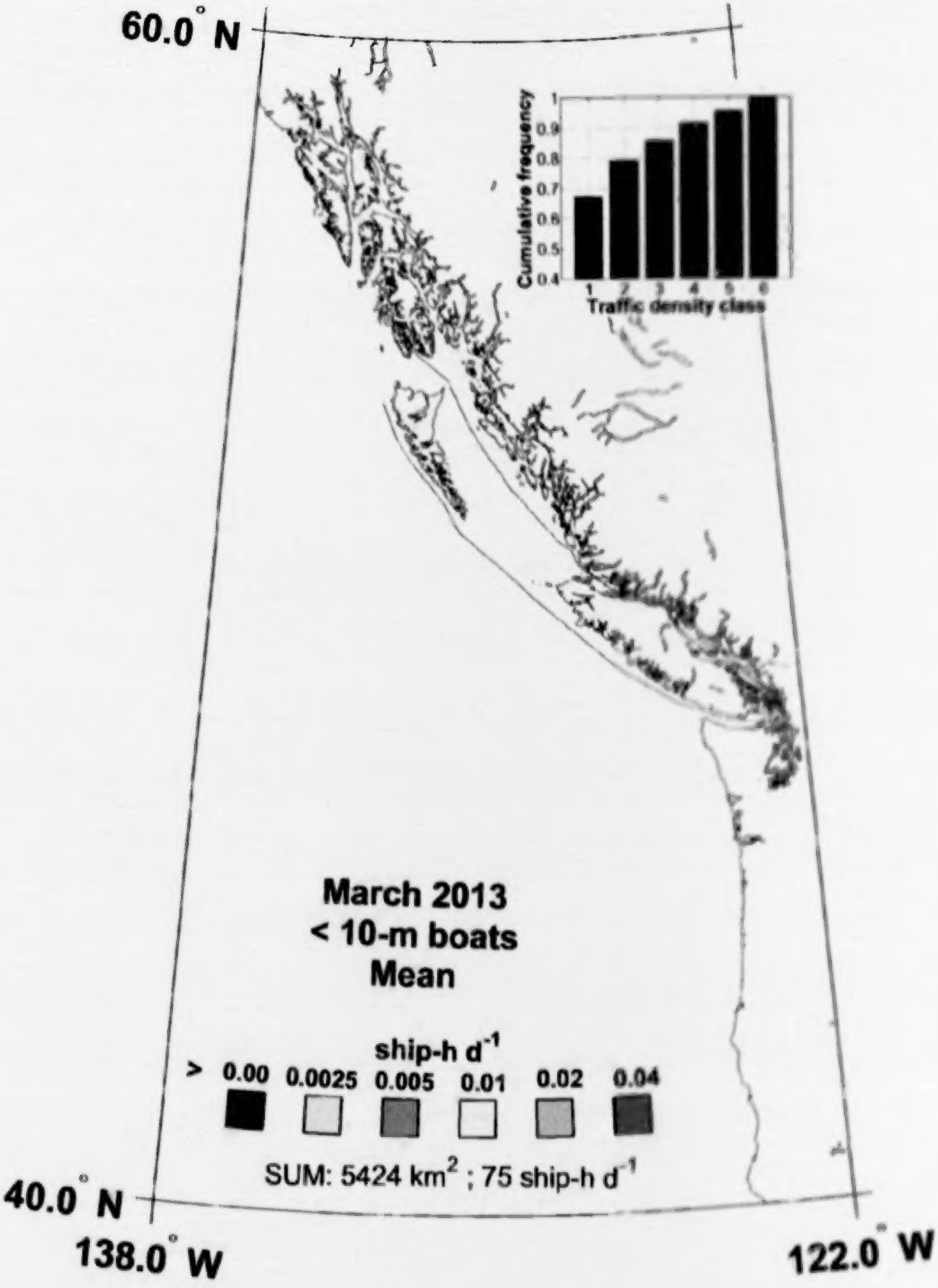

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
< 10-m boats
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 5424 km2 ; 75 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 85. Map of AIS mean traffic density of ships with lengths < 10 min March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

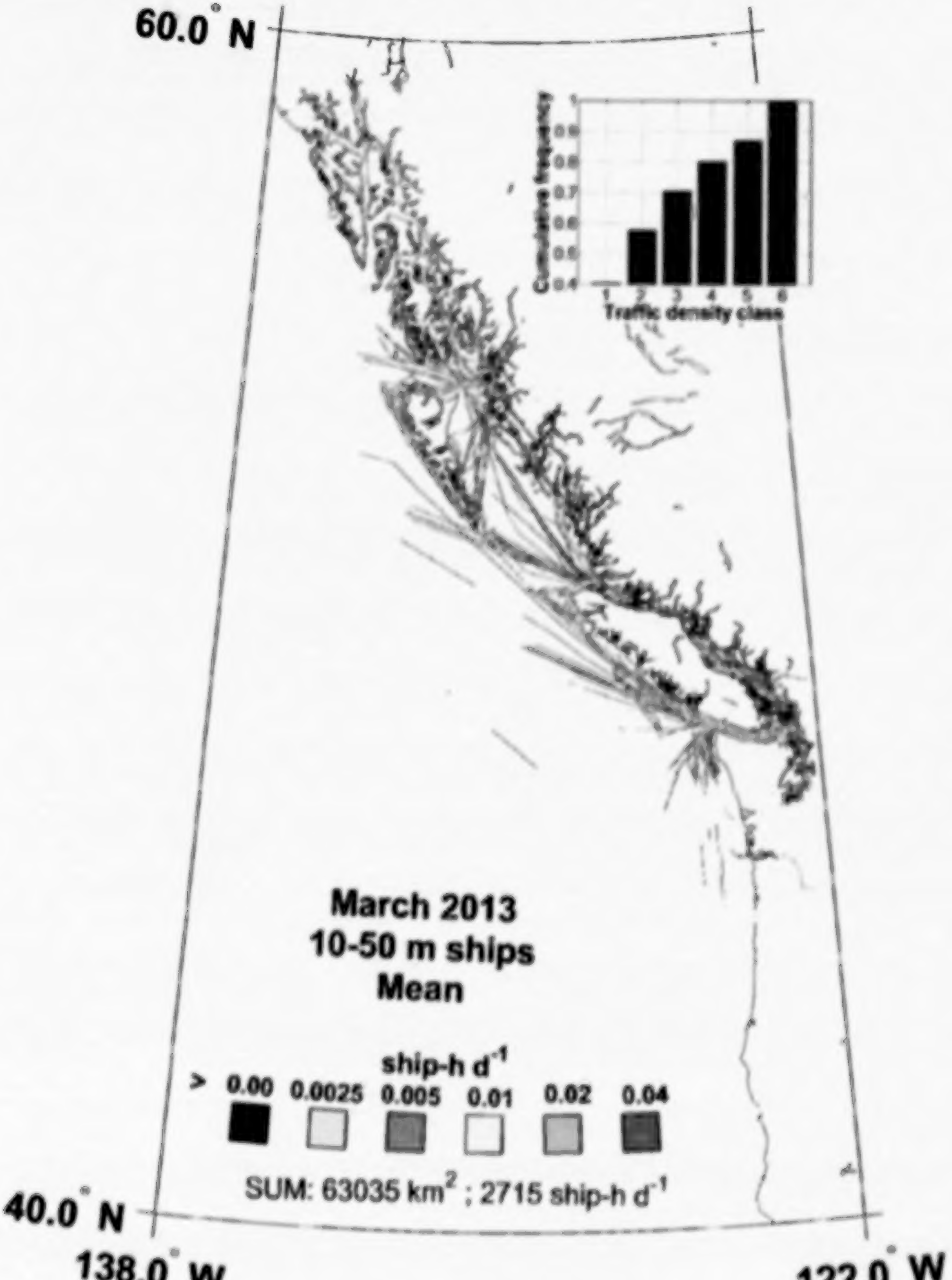

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
10-50 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 63035 km^2 ; 2715 ship-h d^{-1}

Figure 86. Map of AIS mean traffic density of 10 to 50 m ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

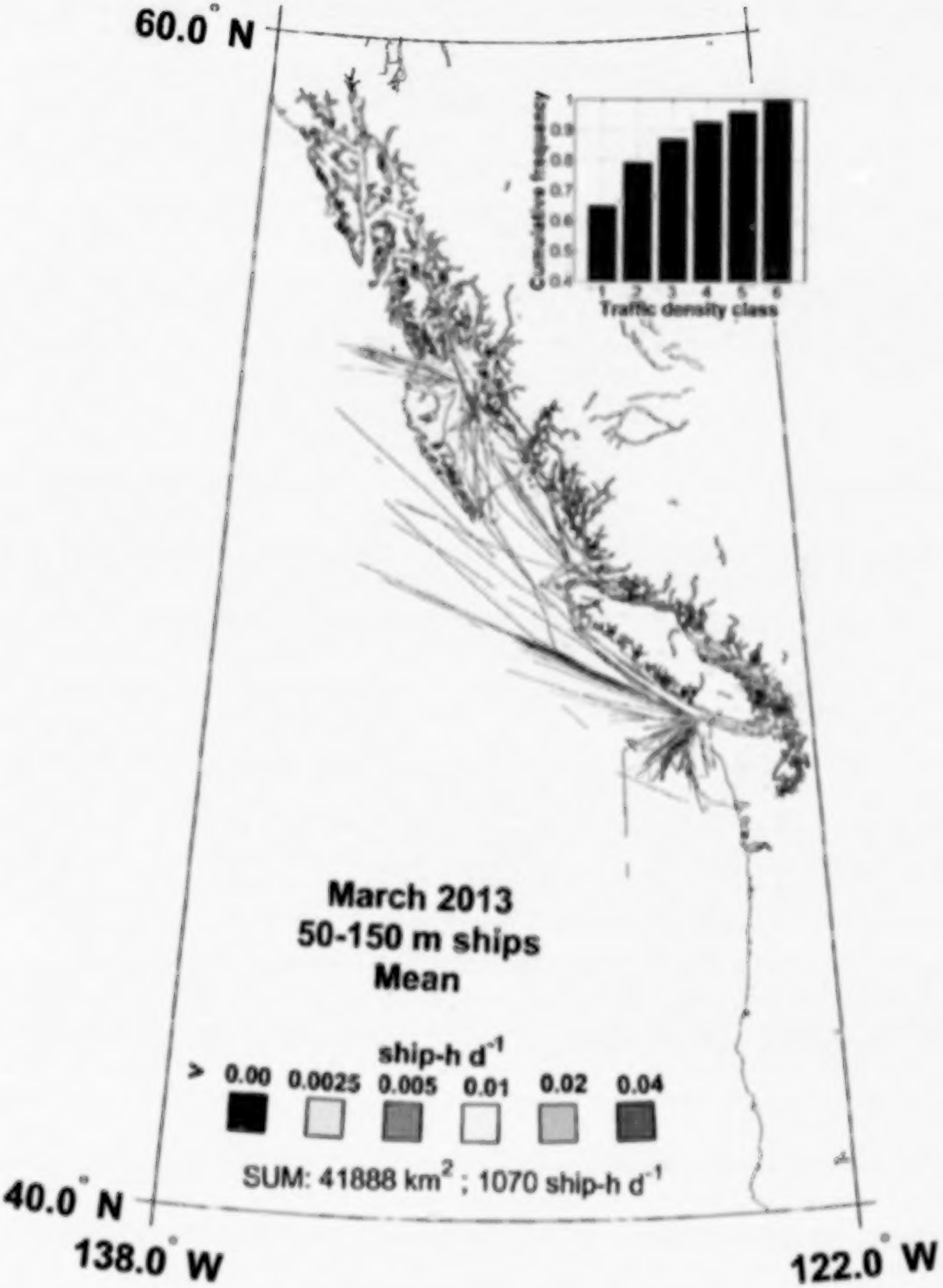

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
March 2013
50-150 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 41888 km² ; 1070 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 87. Map of AIS mean traffic density of 50 to 150 m ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

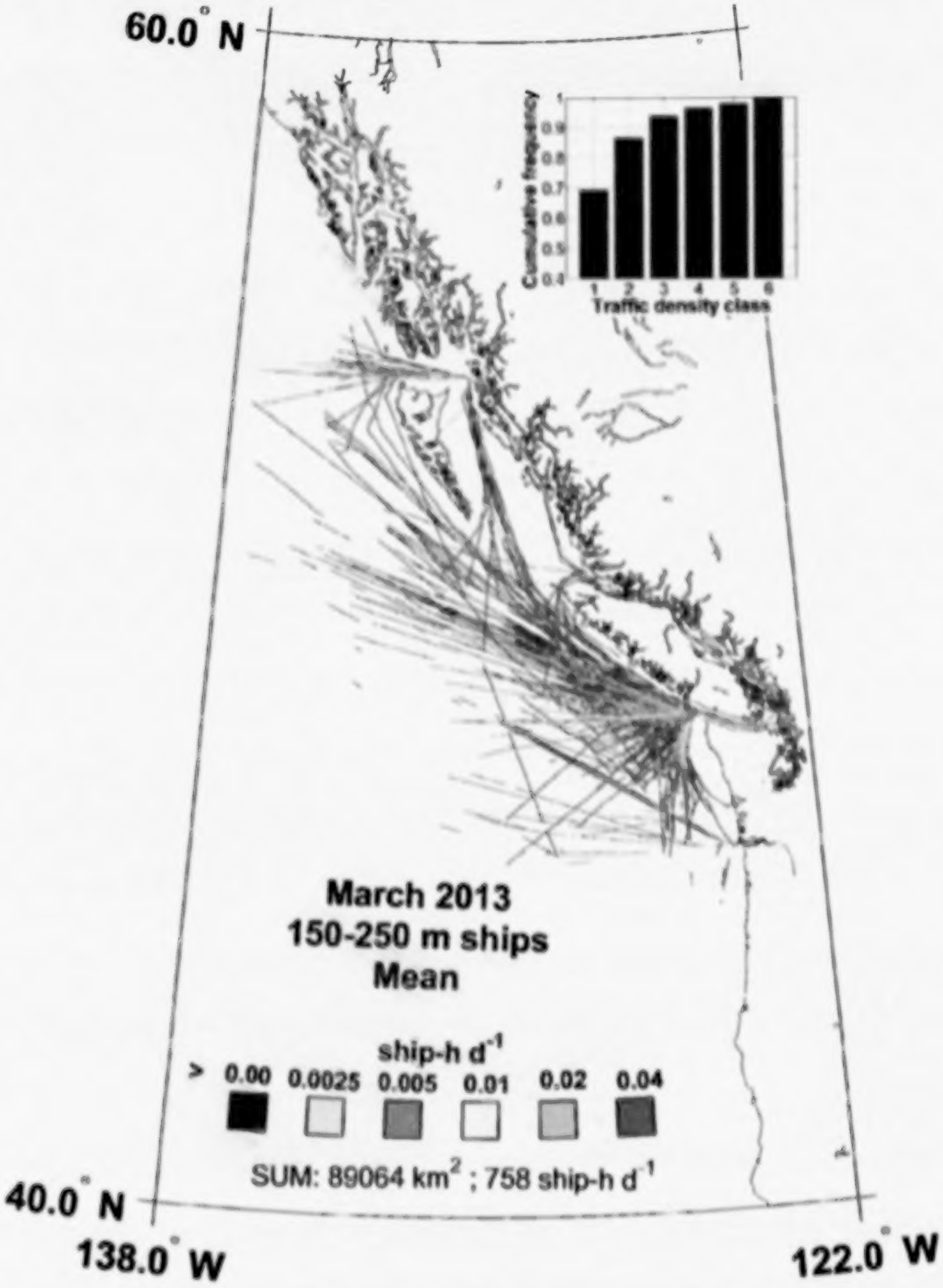

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
150-250 m ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 89064 km2 ; 758 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 88. Map of AIS mean traffic density of 150 to 250 m ships in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

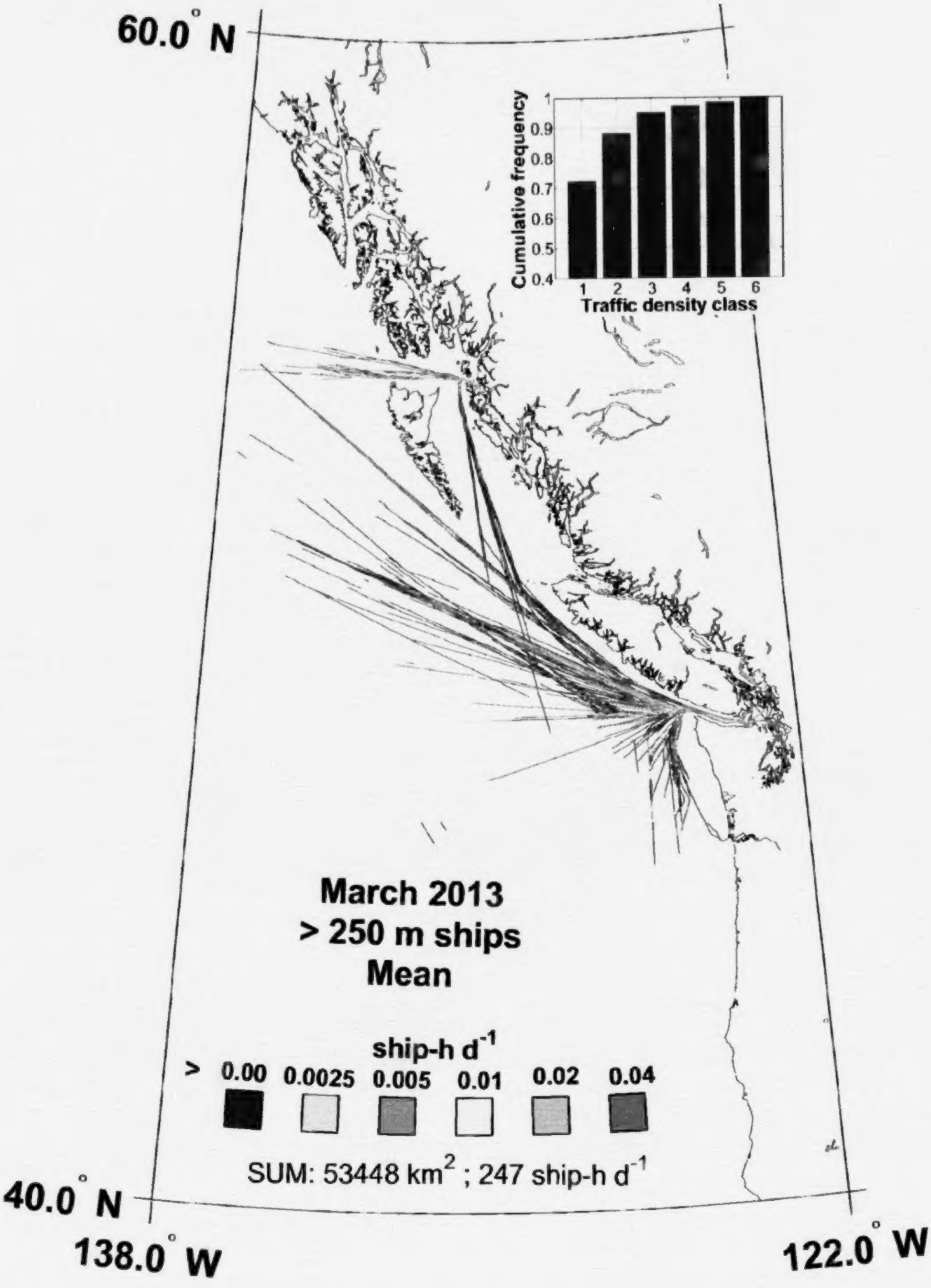

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
> 250 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 53448 km² ; 247 ship-h d⁻¹

Figure 89. Map of >250 m ship AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

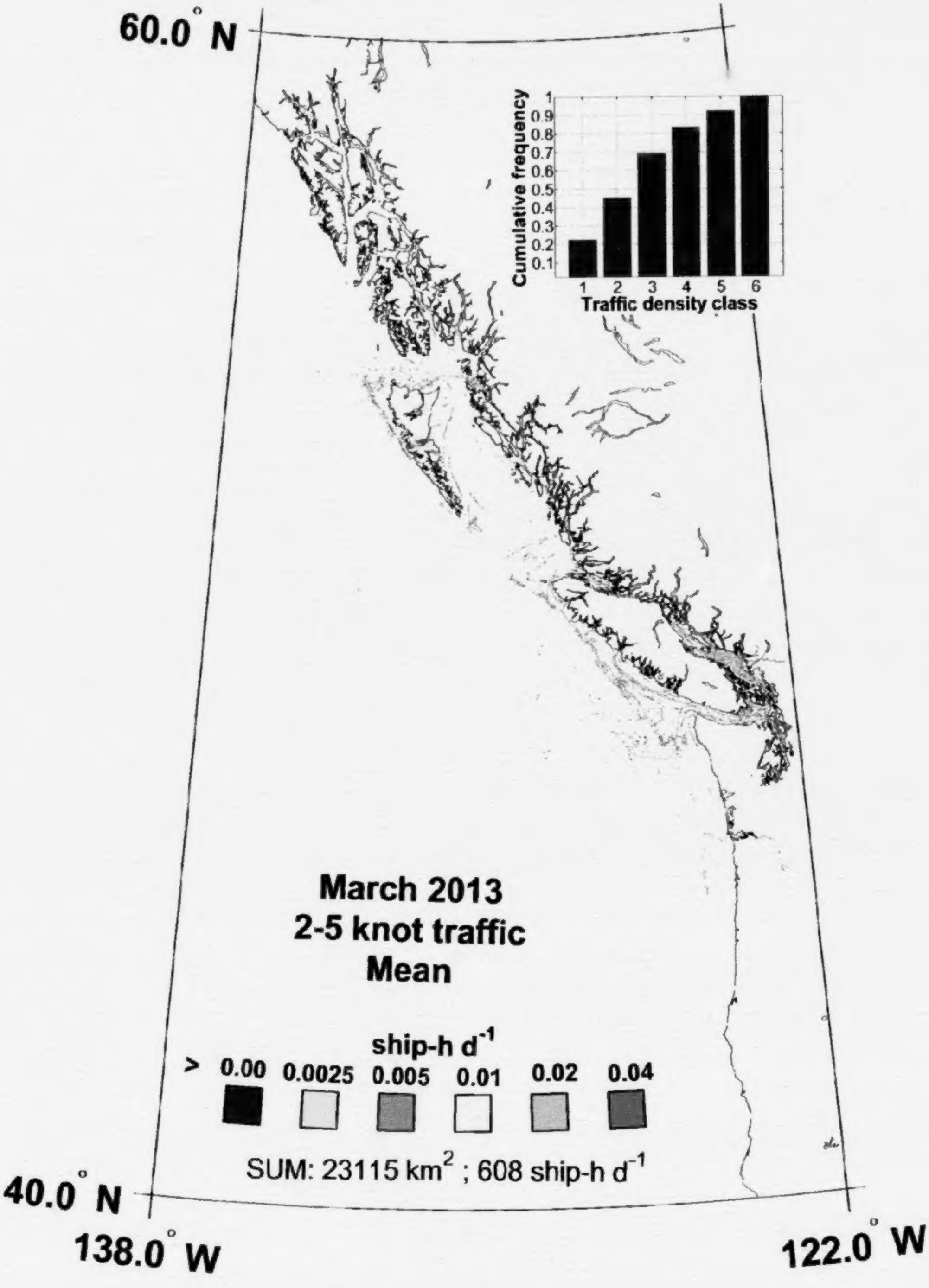

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
March 2013
2-5 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 23115 km^2 ; 608 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 90. Map of 2–5 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

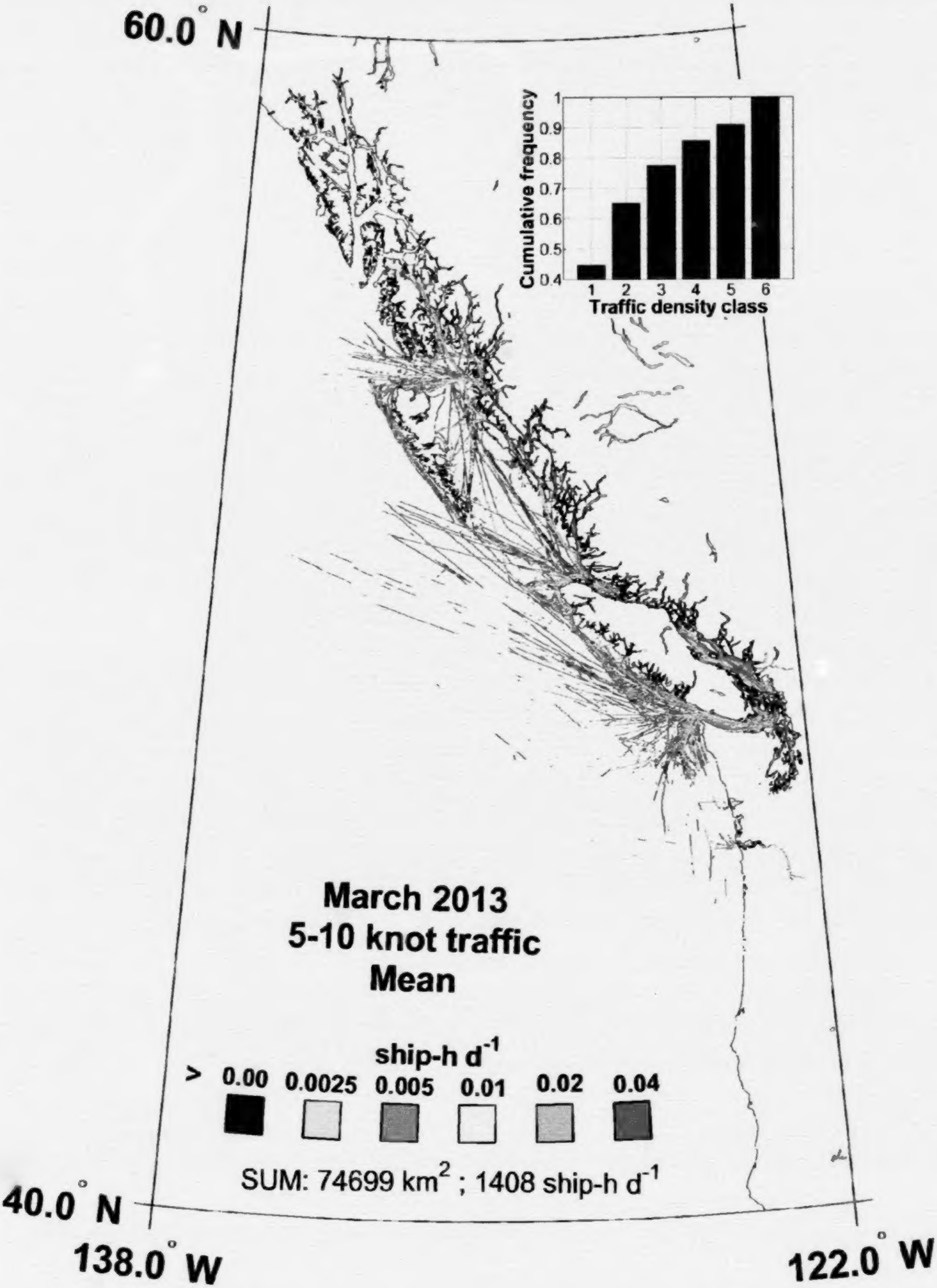

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
March 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 74699 km^2 ; 1408 ship-h d^{-1}

Figure 91. Map of 5–10 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

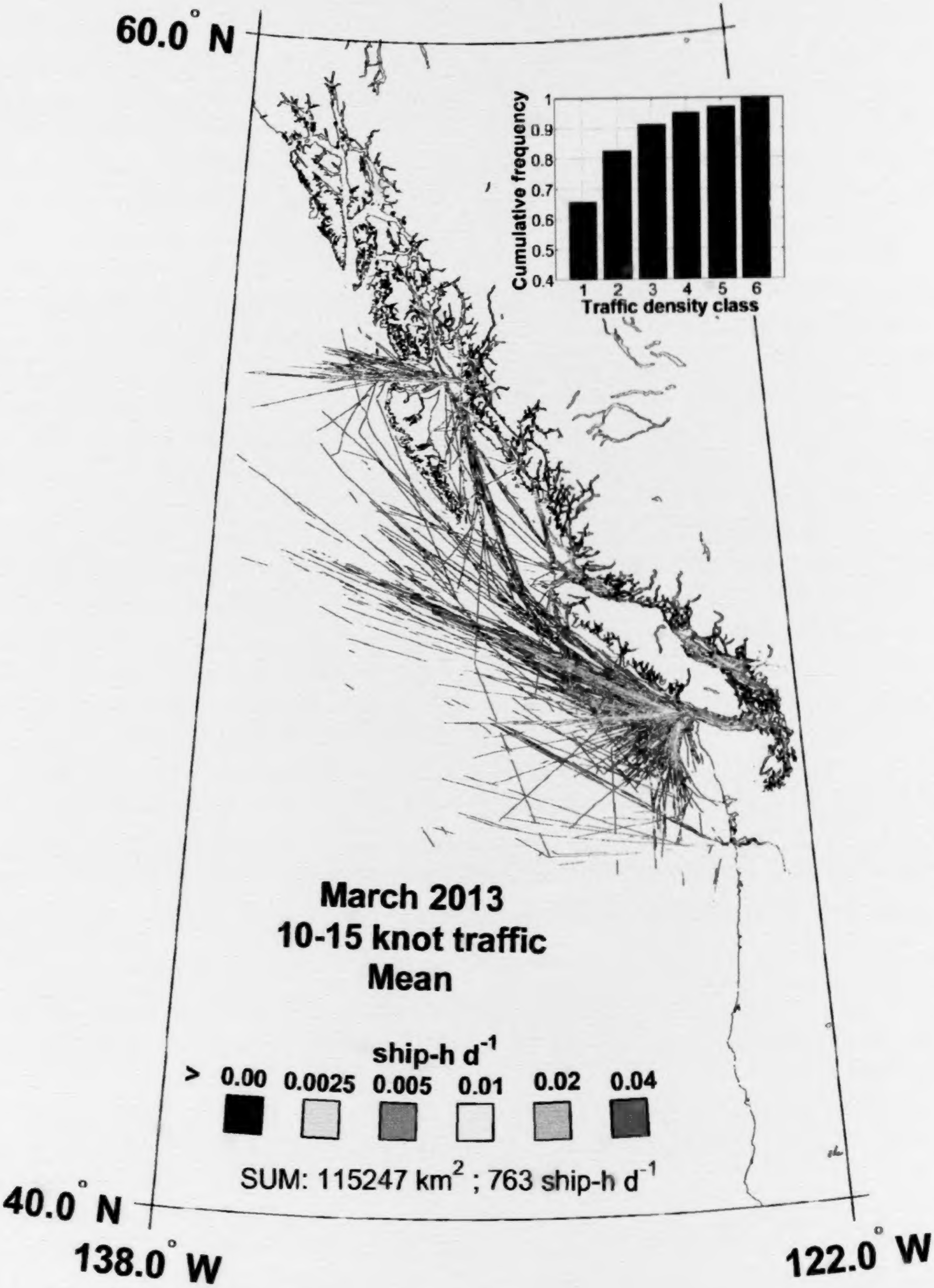

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 115247 km^2 ; 763 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 92. Map of 10–15 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

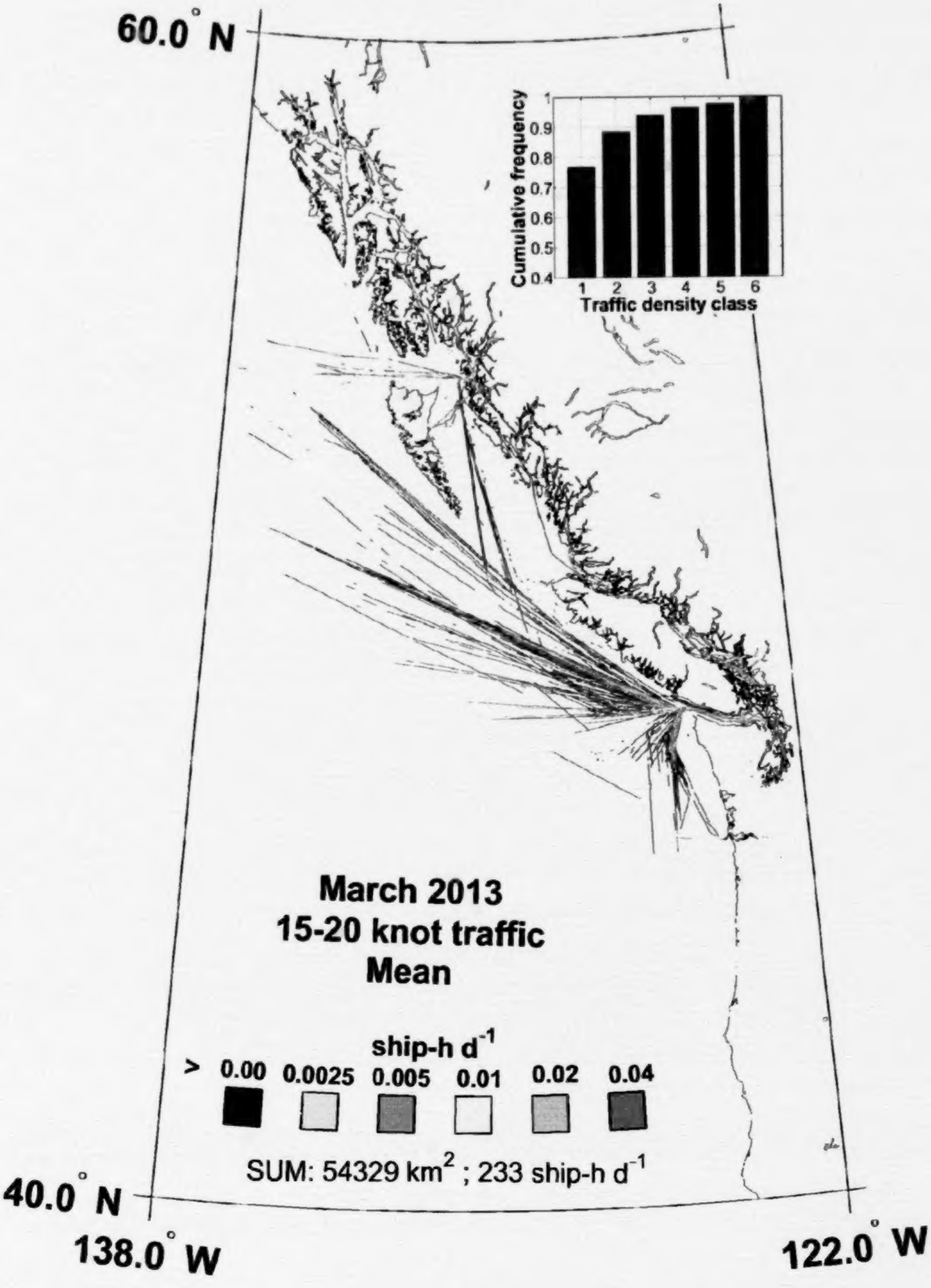

60.0° N
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
March 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 54329 km^2 ; 233 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 93. Map of 15–20 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

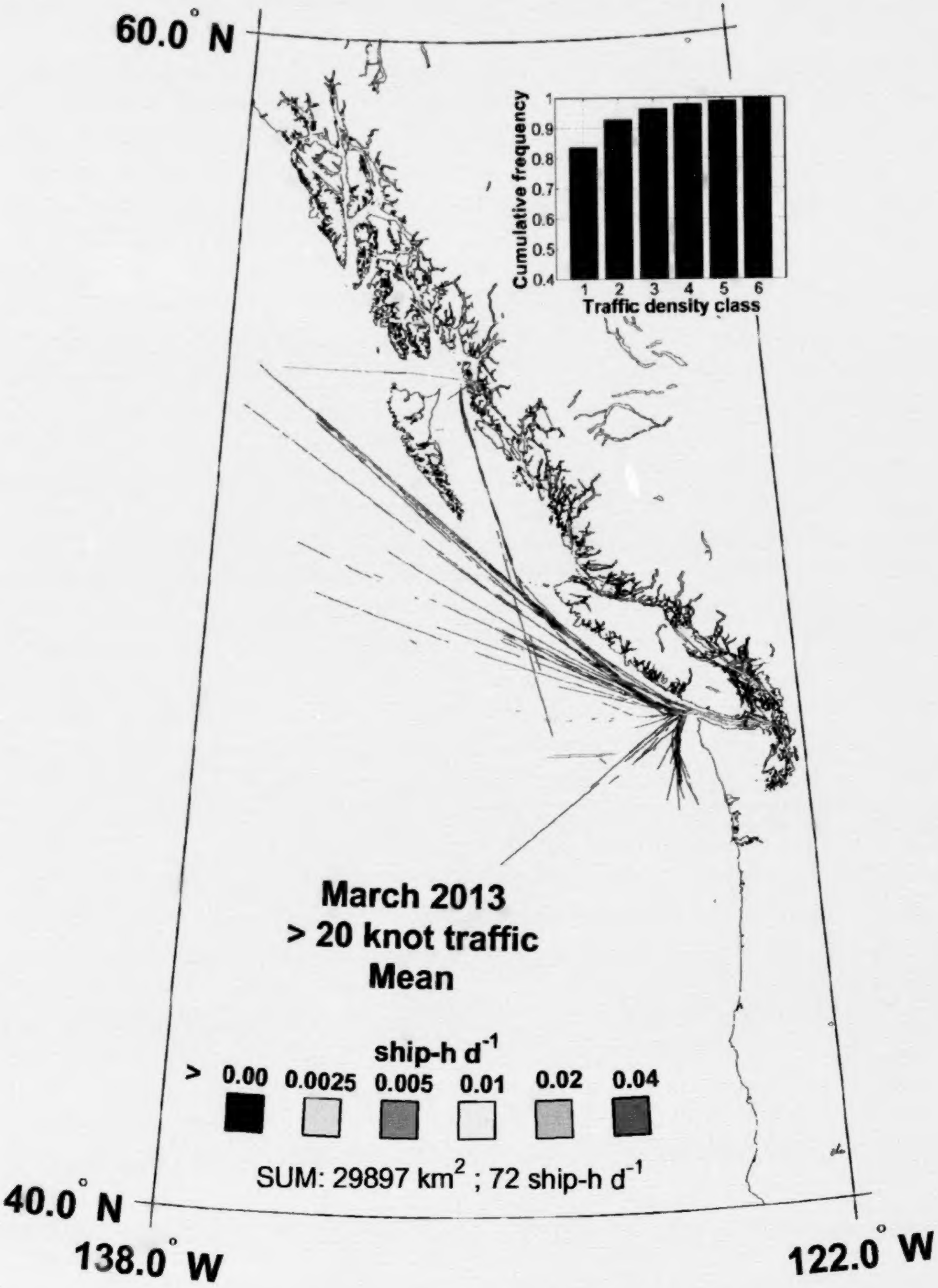

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
March 2013
> 20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 29897 km^2 ; 72 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 94. Map of >20 knot AIS mean traffic density in March 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.4. April 2013

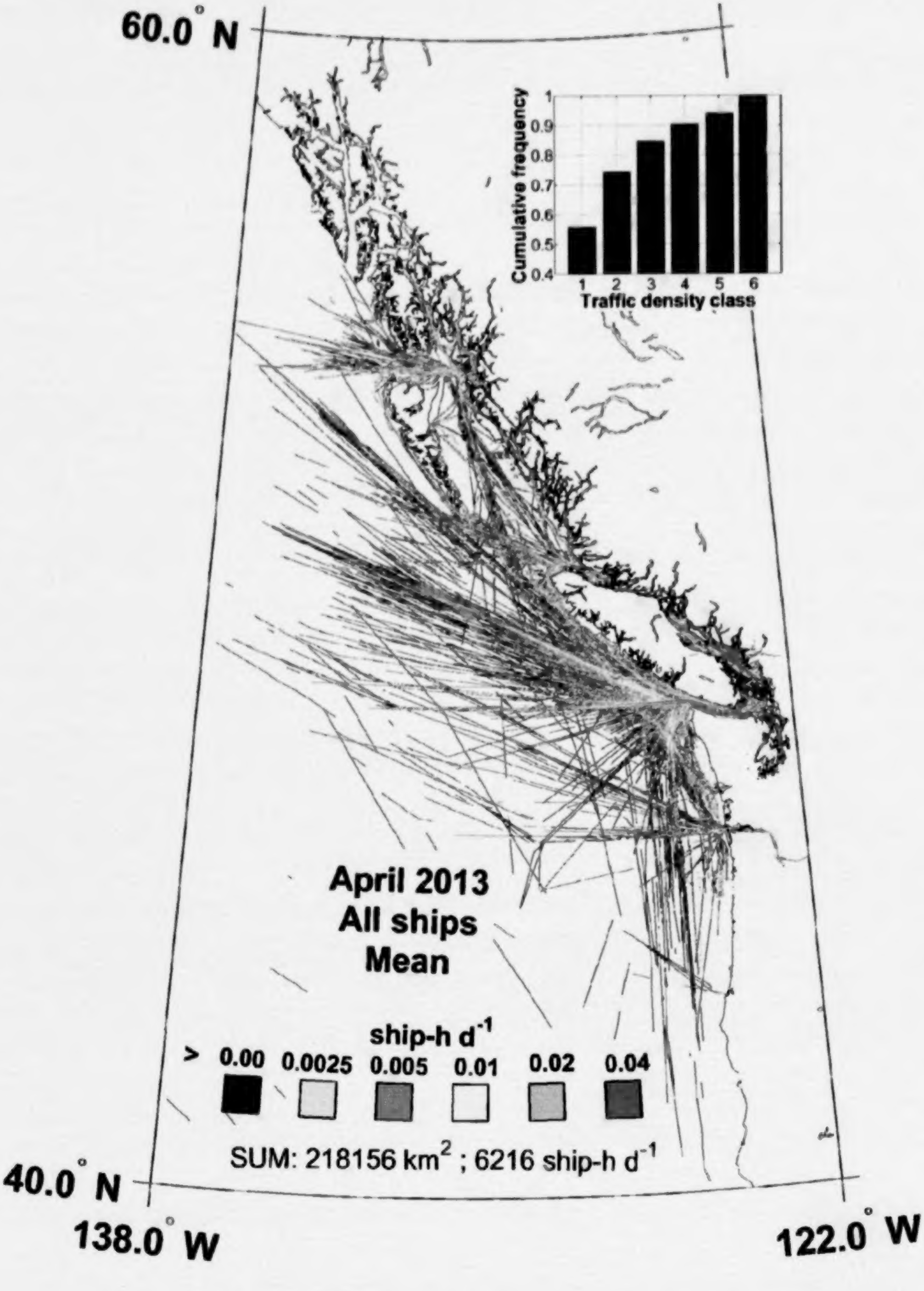

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
April 2013
All ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 218156 km^2 ; 6216 ship-h d^{-1}

Figure 95. Map of AIS mean traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

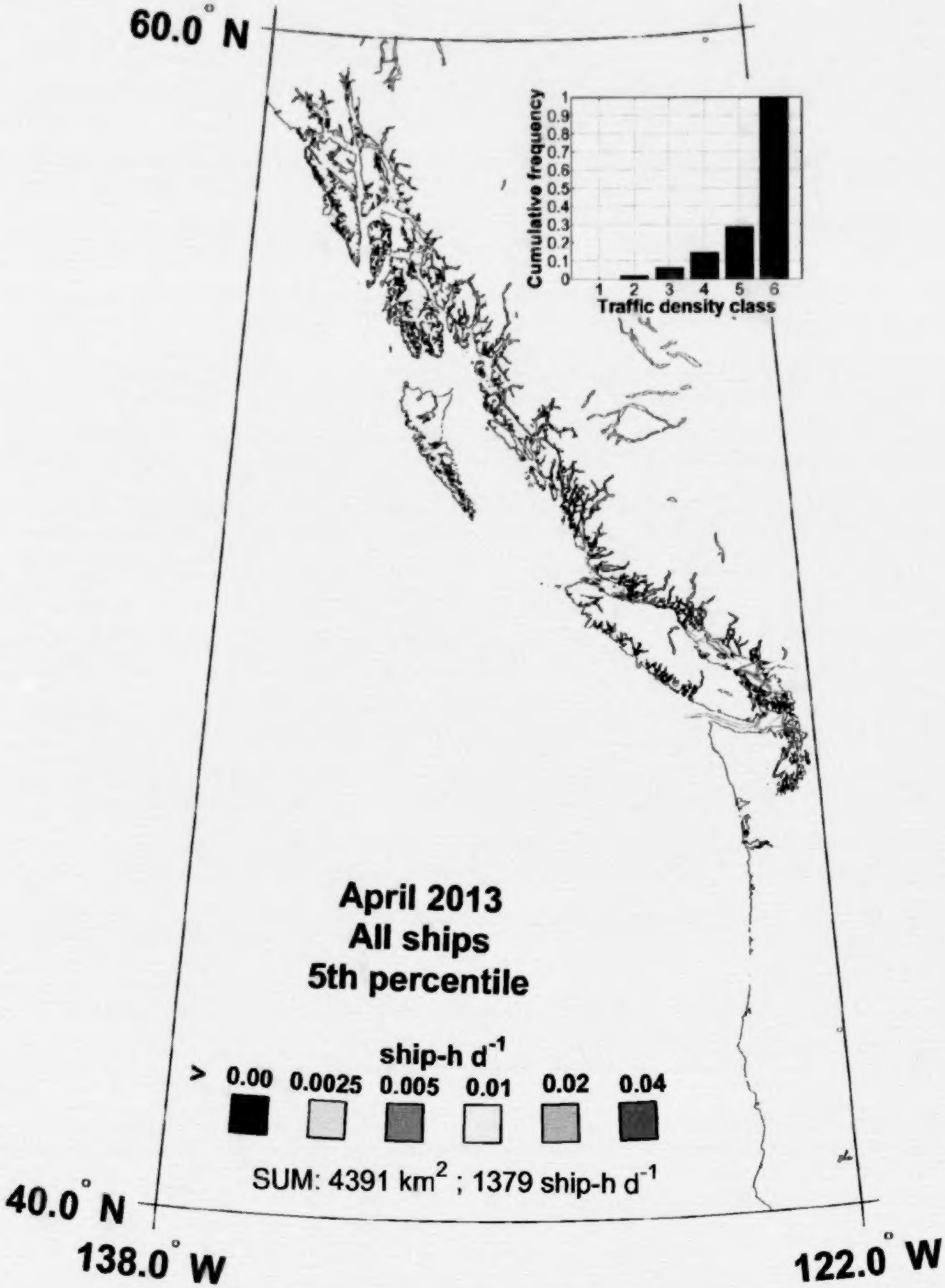

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
April 2013
All ships
5th percentile
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 4391 km² ; 1379 ship-h d⁻¹

Figure 96. Map of the 5^{th} percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

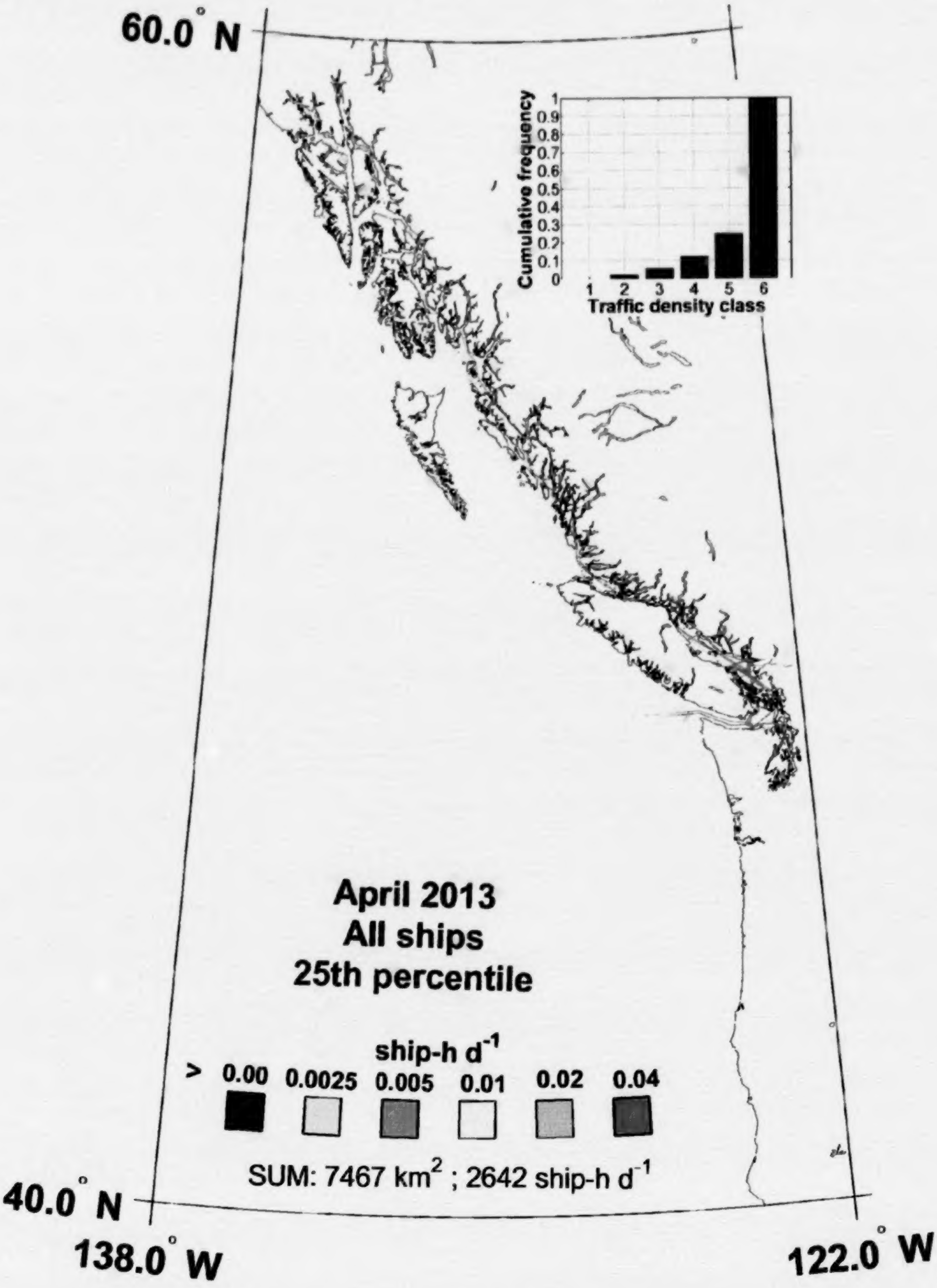

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
April 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 7467 km^2 ; 2642 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 97. Map of the 25th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

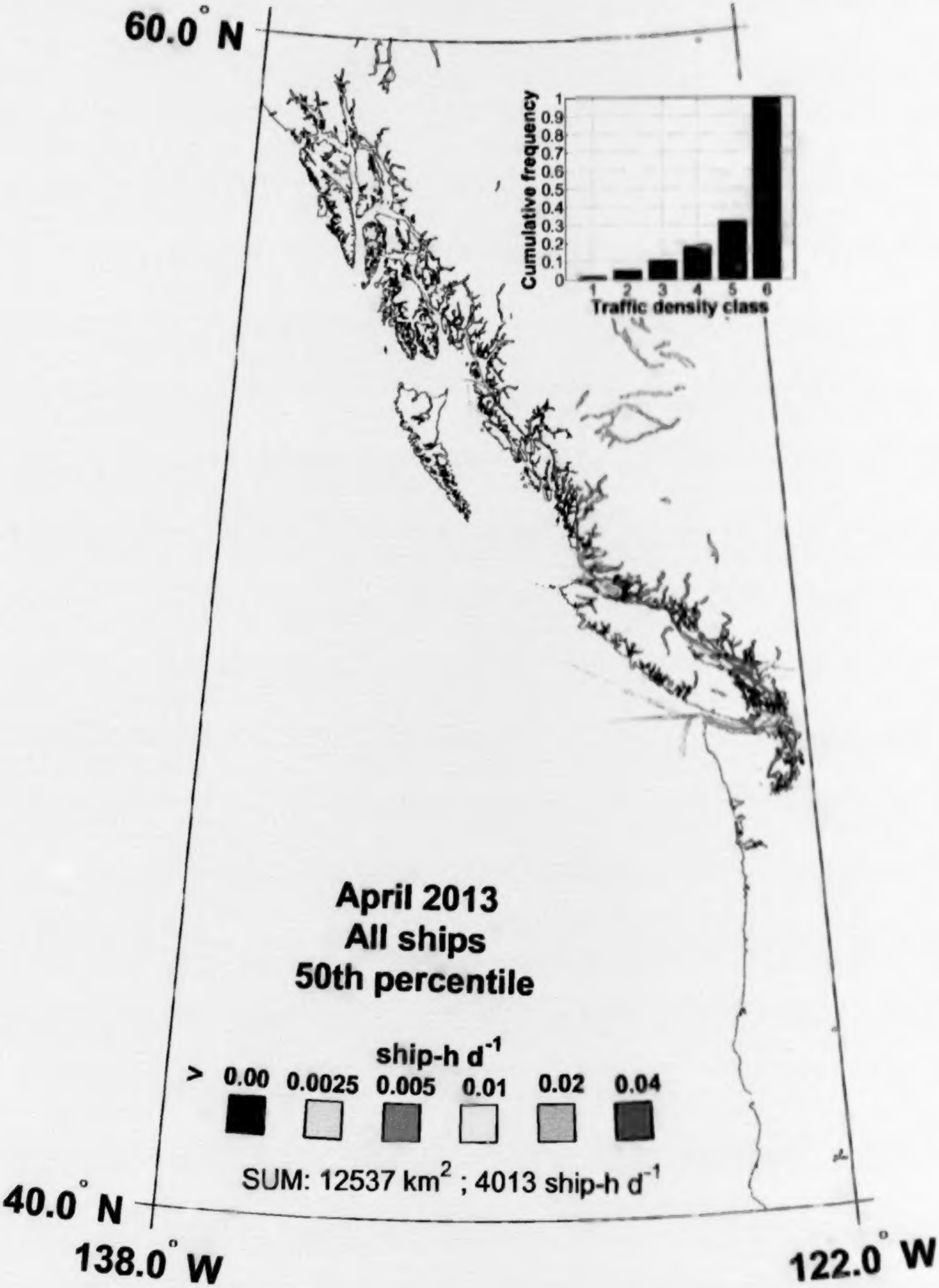

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
April 2013
All ships
50th percentile
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 12537 km2 ; 4013 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 98. Map of the 50th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

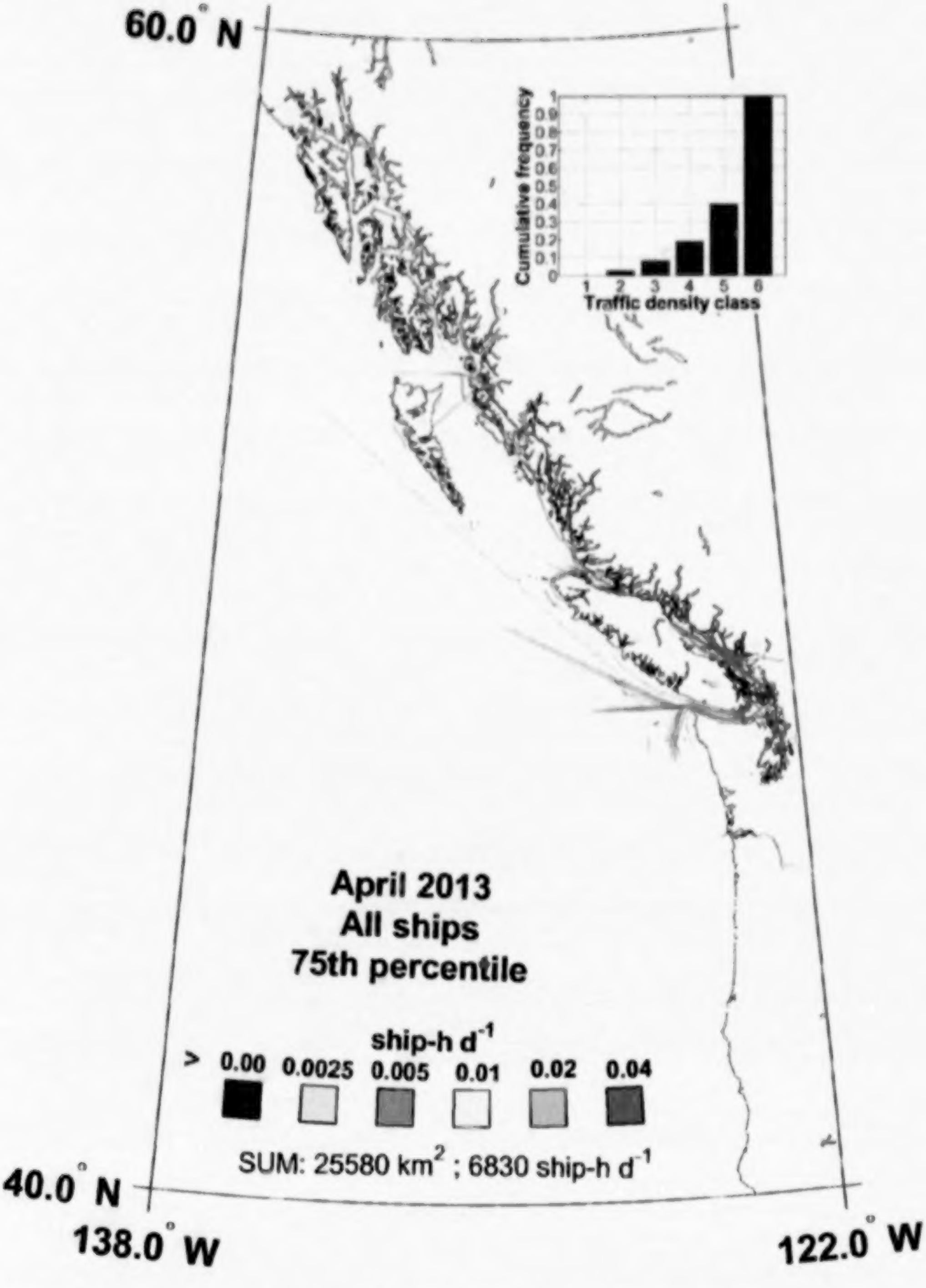

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
April 2013
All ships
75th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 25580 km² ; 6830 ship-h d⁻¹

Figure 99. Map of the 75th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

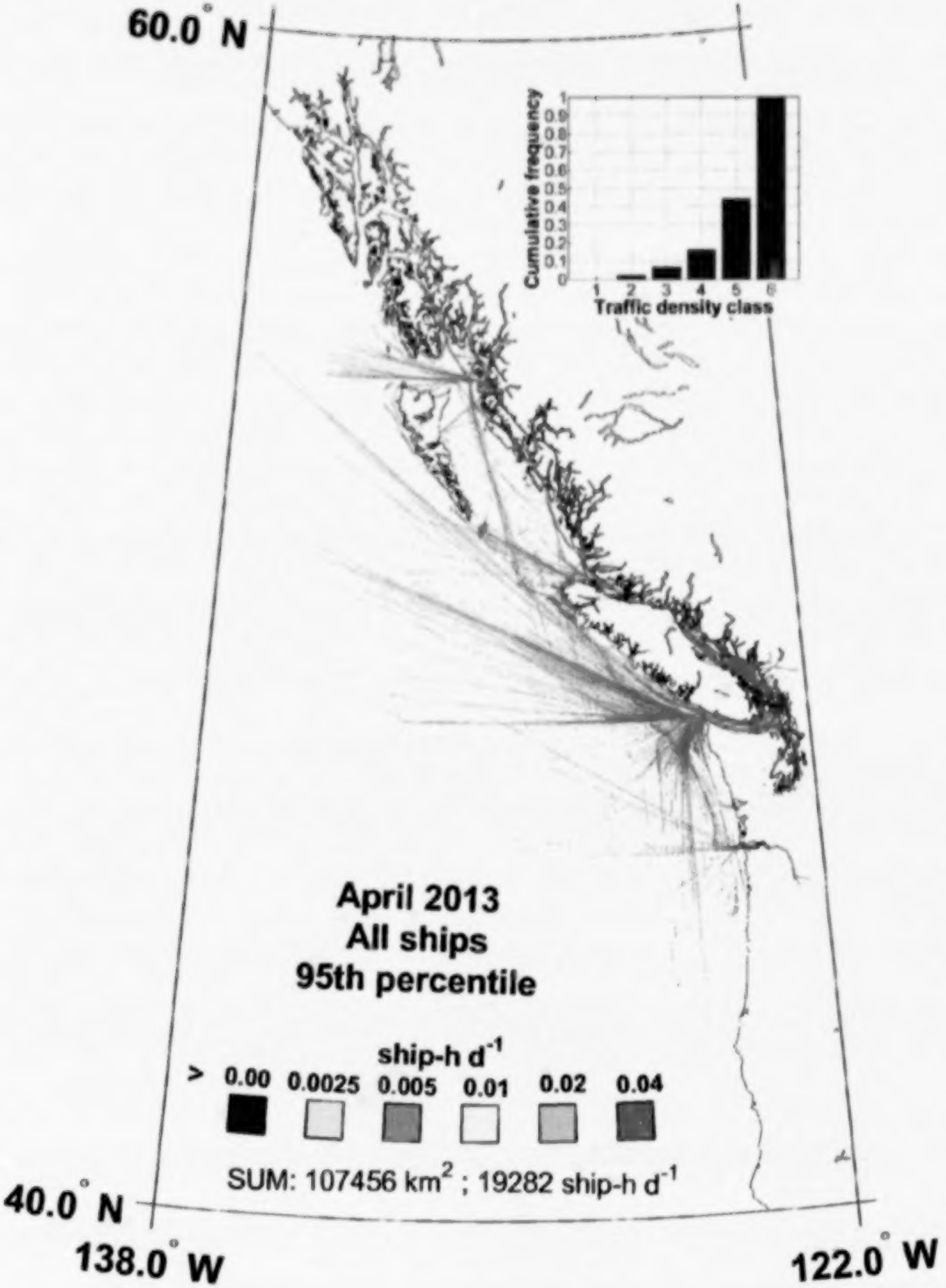

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
April 2013
All ships
95th percentile
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 107456 km2 ; 19282 ship-h d-1

Figure 100. Map of the 95th percentile of the daily AIS traffic density of all ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

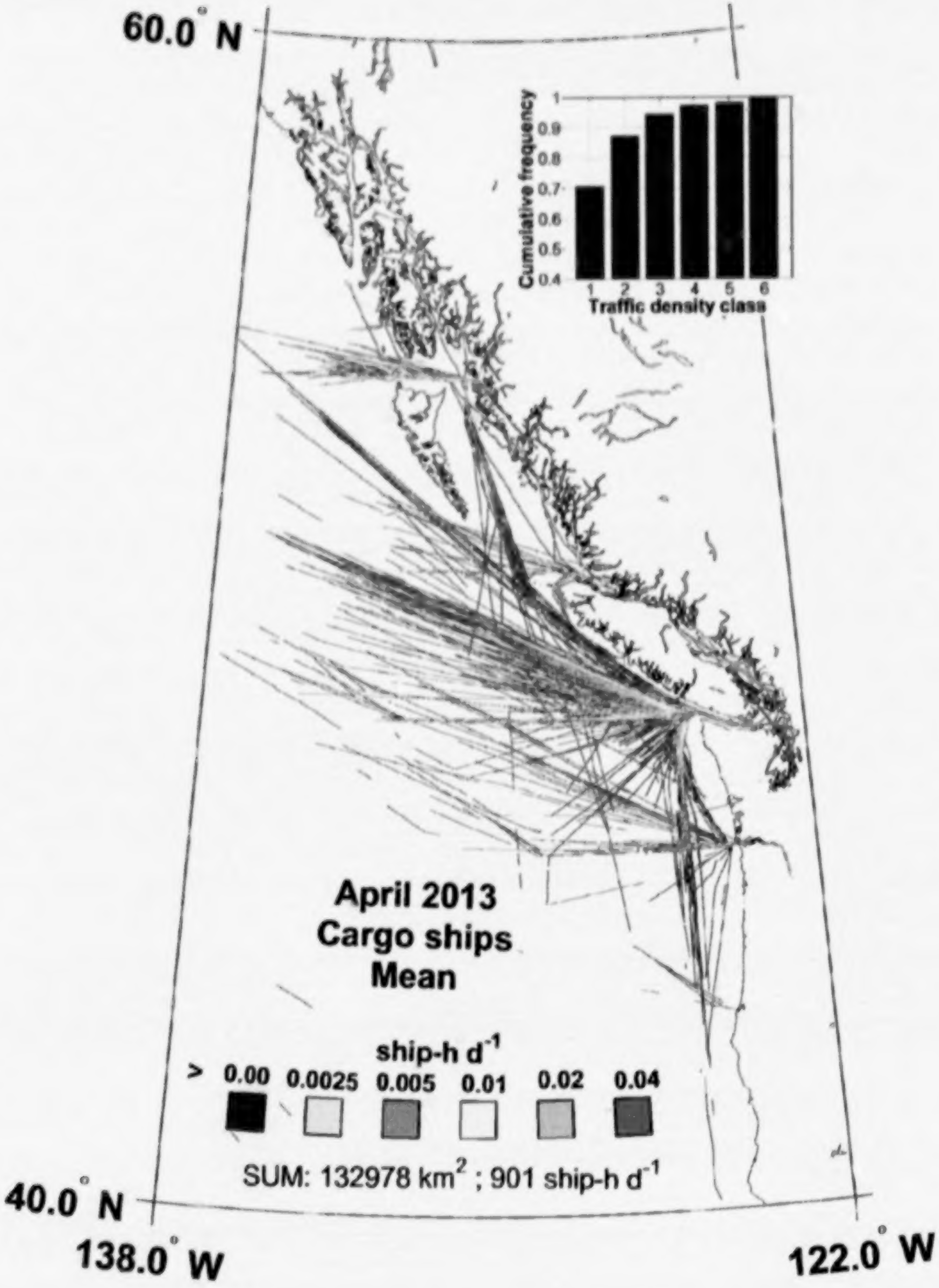

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
April 2013
Cargo ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 132978 km2 ; 901 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 101. Map of AIS mean traffic density of cargo-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

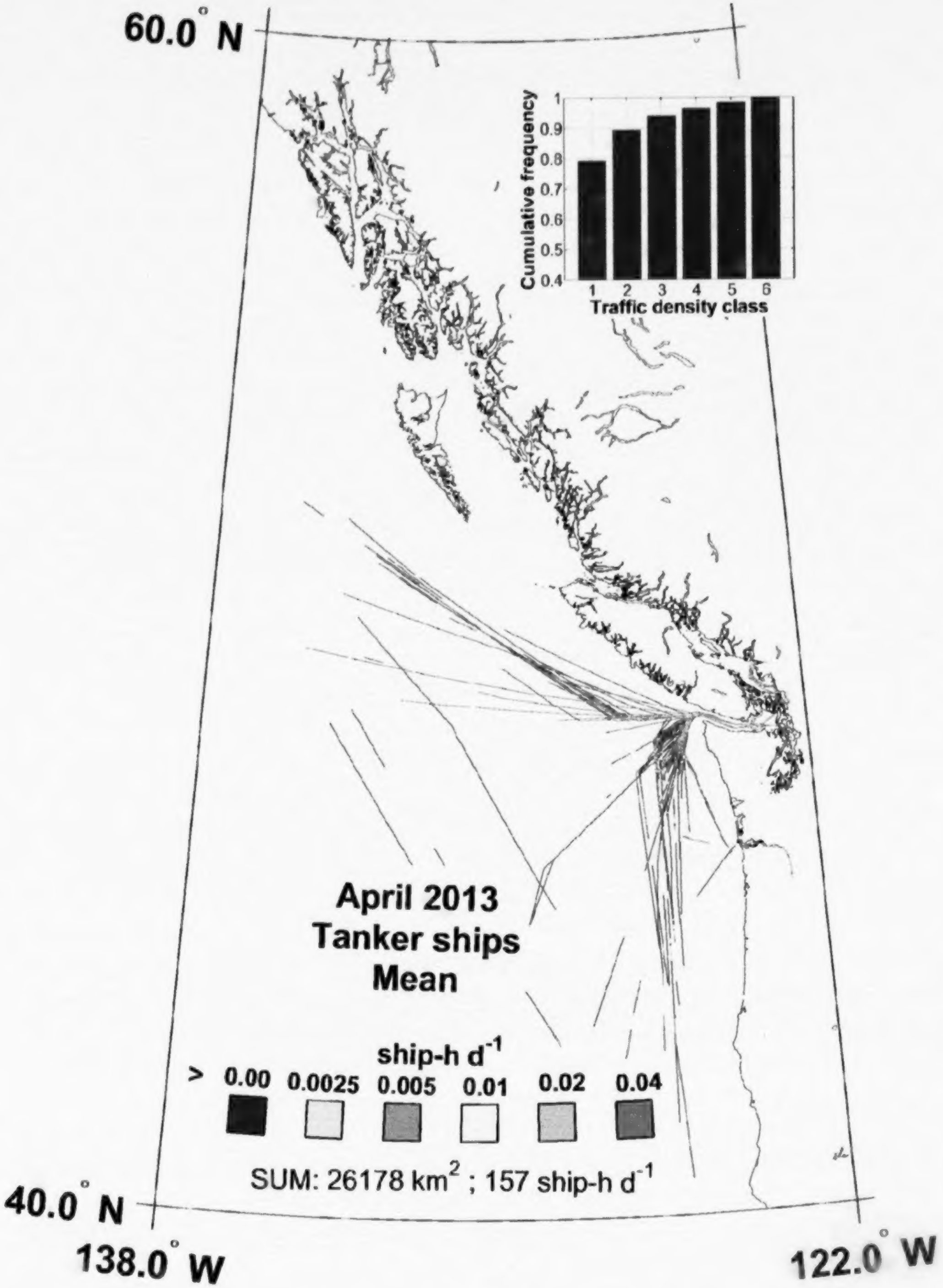

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
Tanker ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 26178 km2 ; 157 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 102. Map of AIS mean traffic density of tanker-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

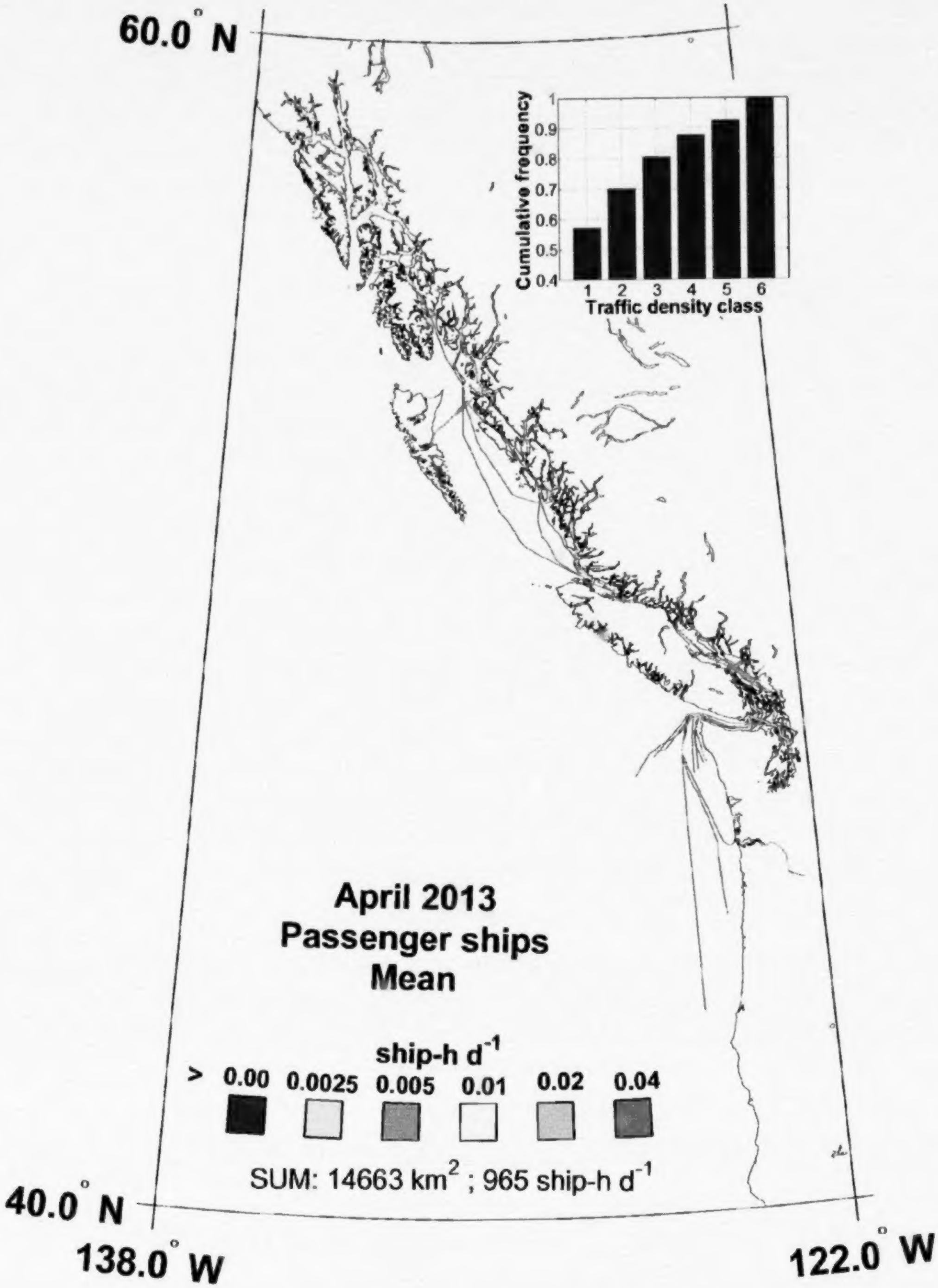

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
April 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 14663 km^2 ; 965 ship-h d^{-1}

Figure 103. Map of AIS mean traffic density of passenger-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

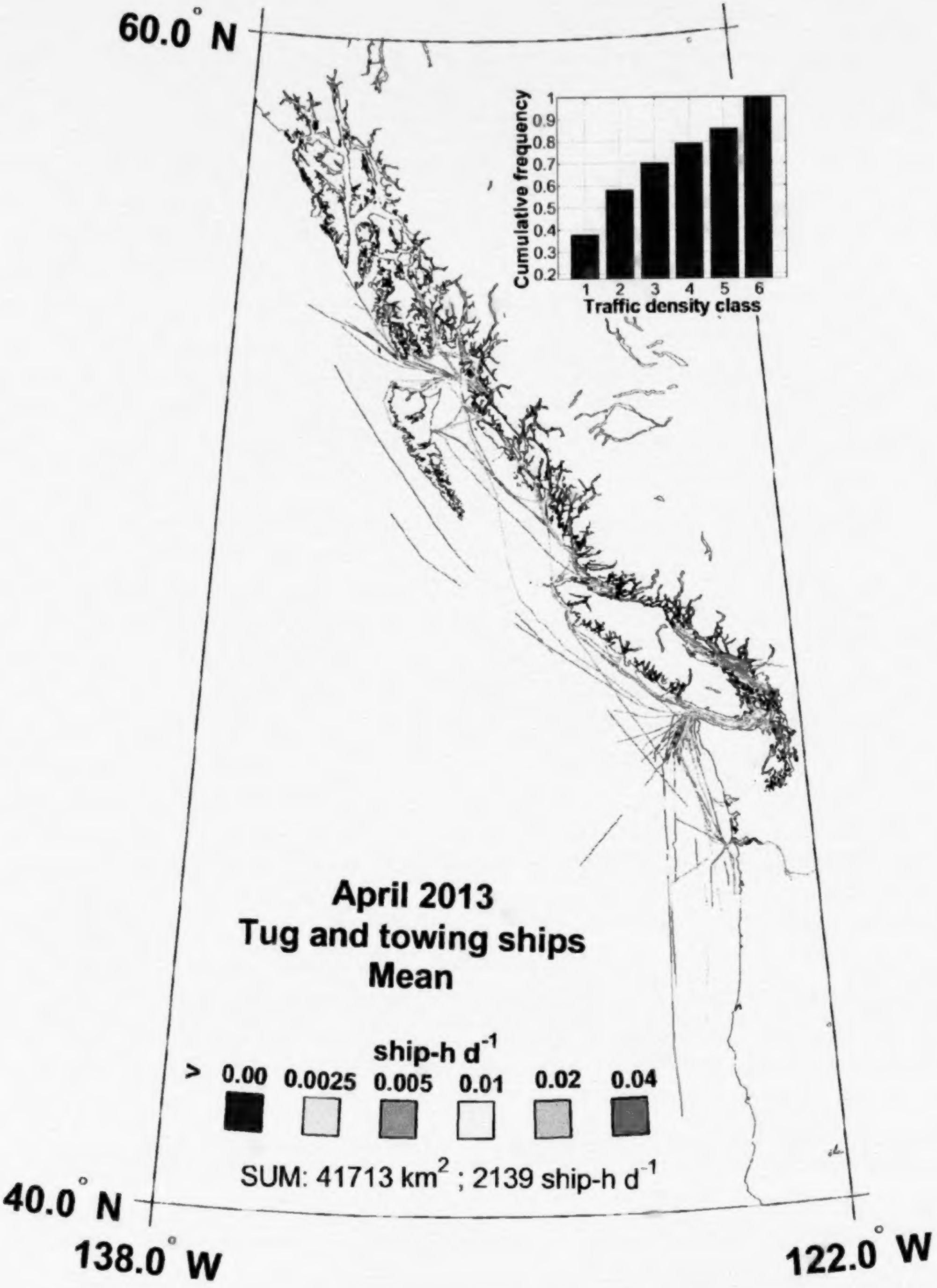

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
April 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 41713 km^2 ; 2139 ship-h d^{-1}

Figure 104. Map of AIS mean traffic density of tug and towing -type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

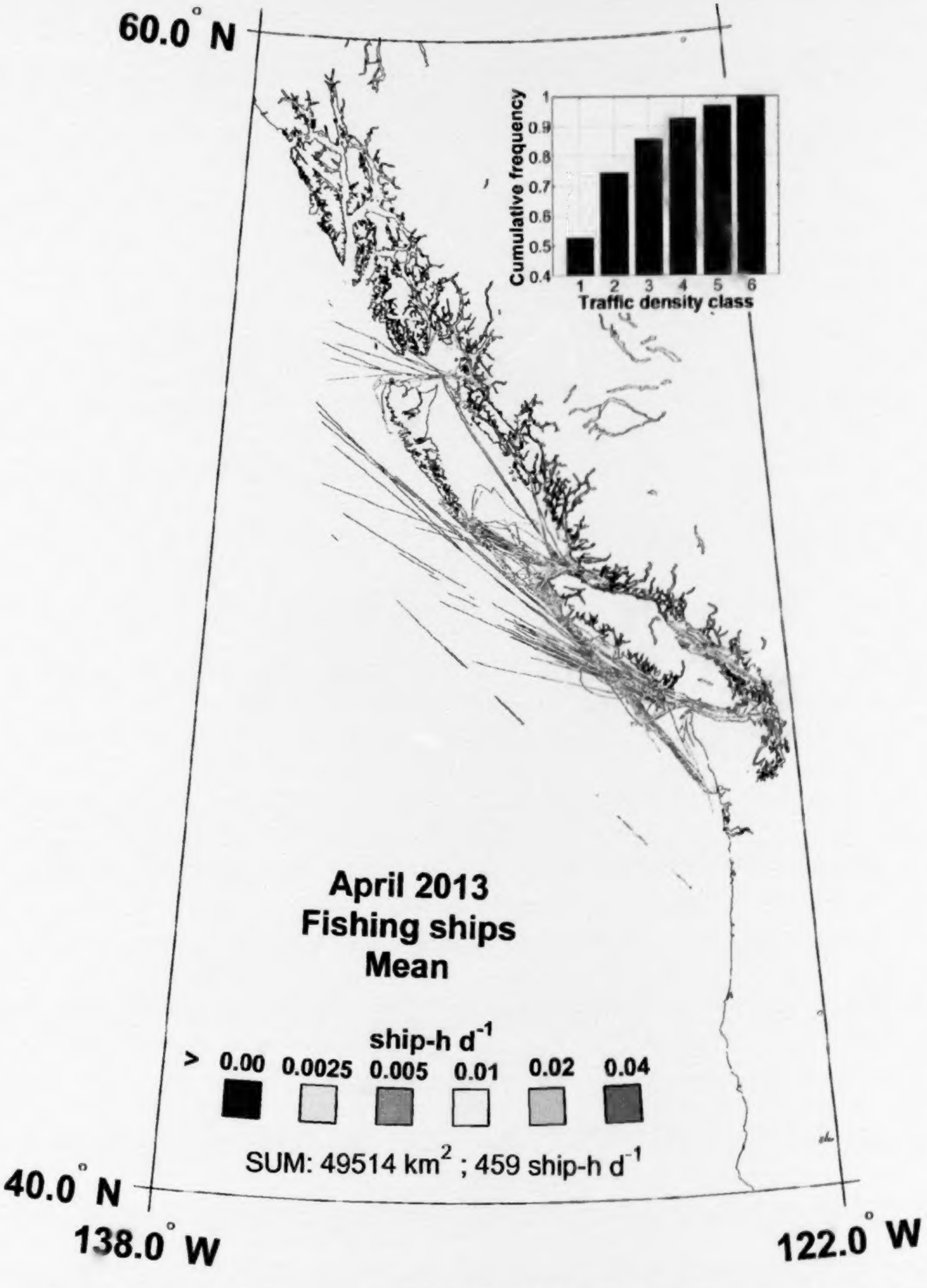

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
Fishing ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 49514 km² ; 459 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 105. Map of AIS mean traffic density of fishing-type ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

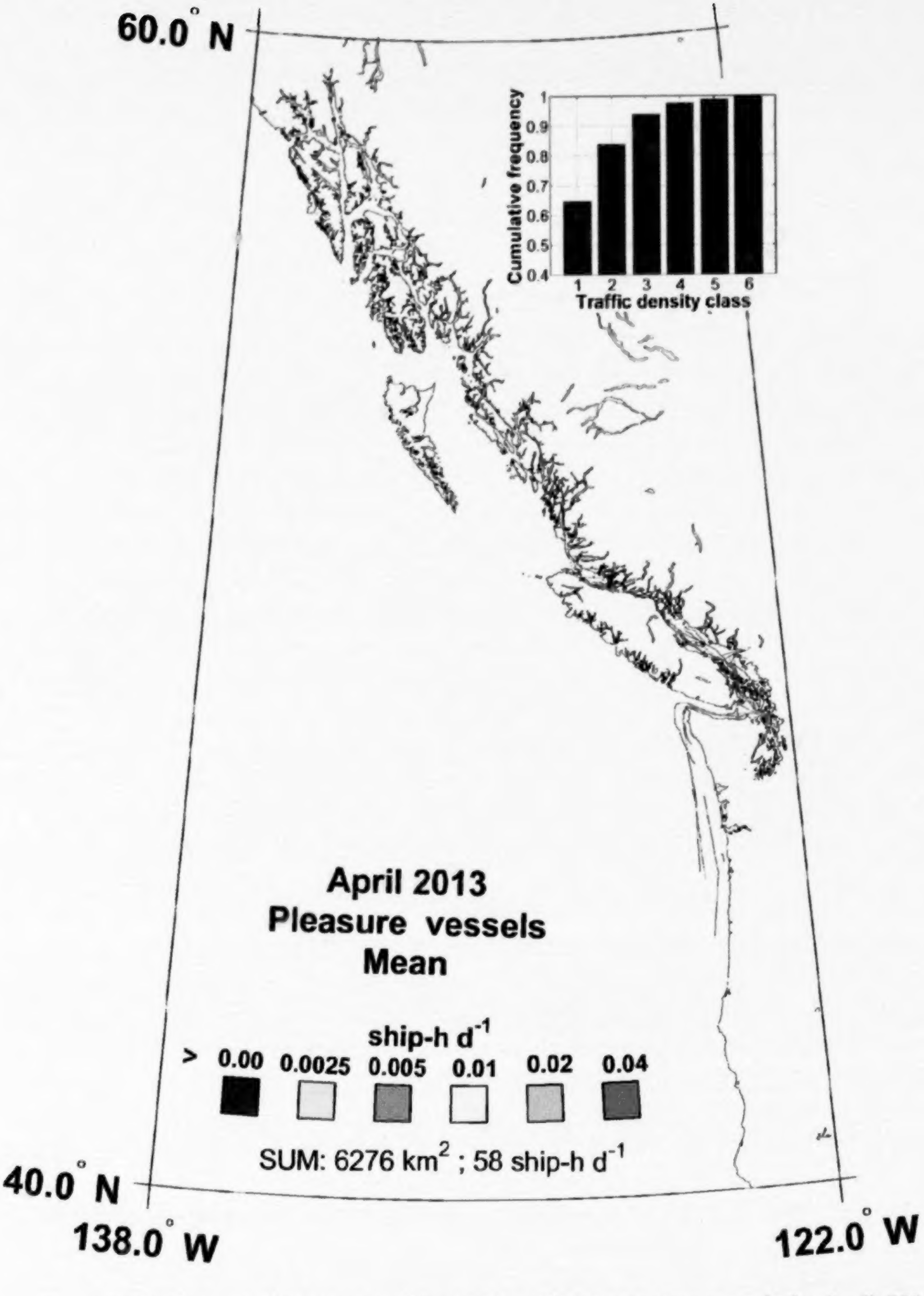

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 6276 km^2 ; 58 ship-h d^{-1}

Figure 106. Map of AIS mean traffic density of pleasure-type vessels in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

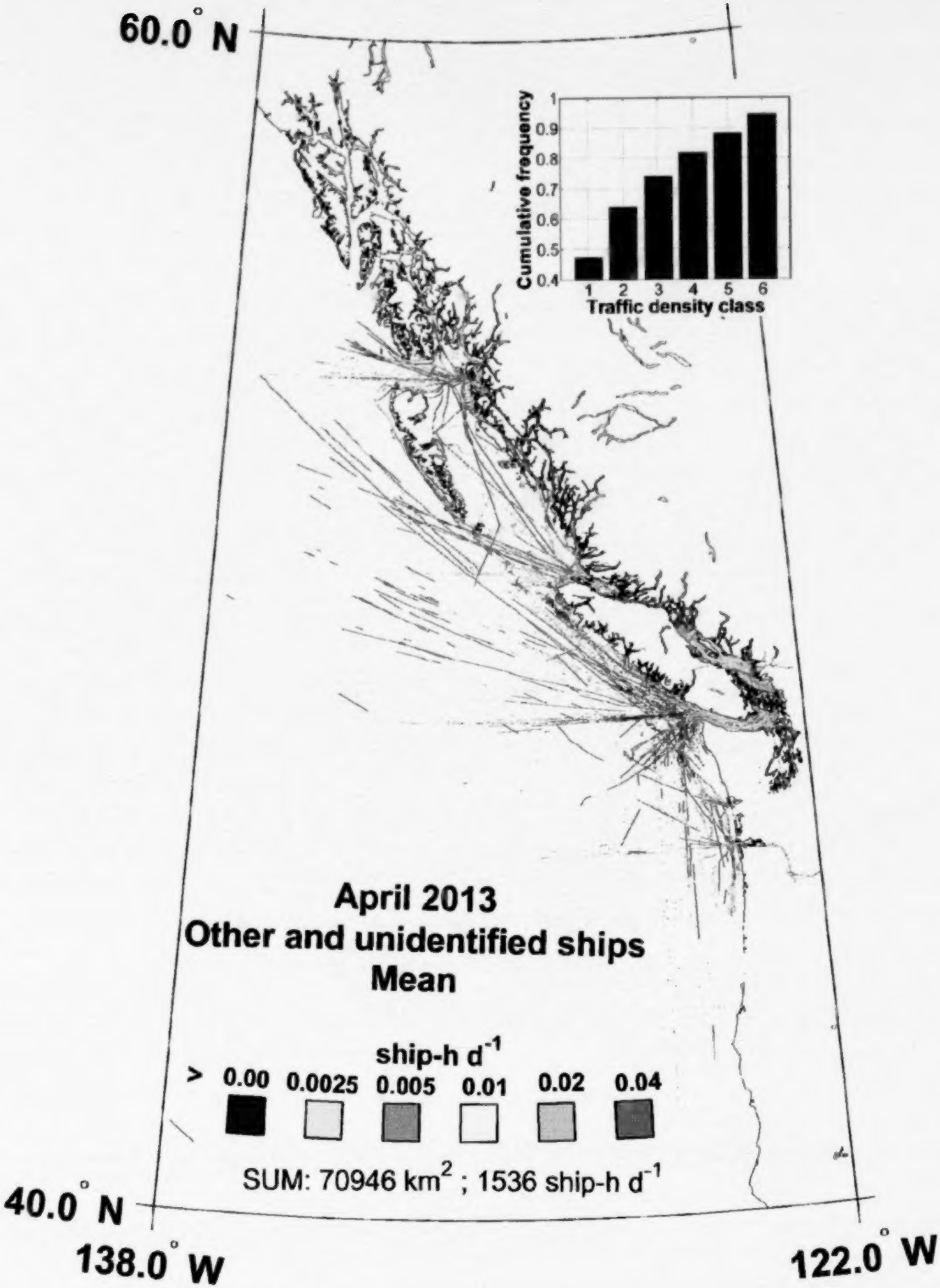

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 70946 km^2 ; 1536 ship-h d^{-1}

Figure 107. Map of AIS mean traffic density of other type of ships and ships of unidentified type in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

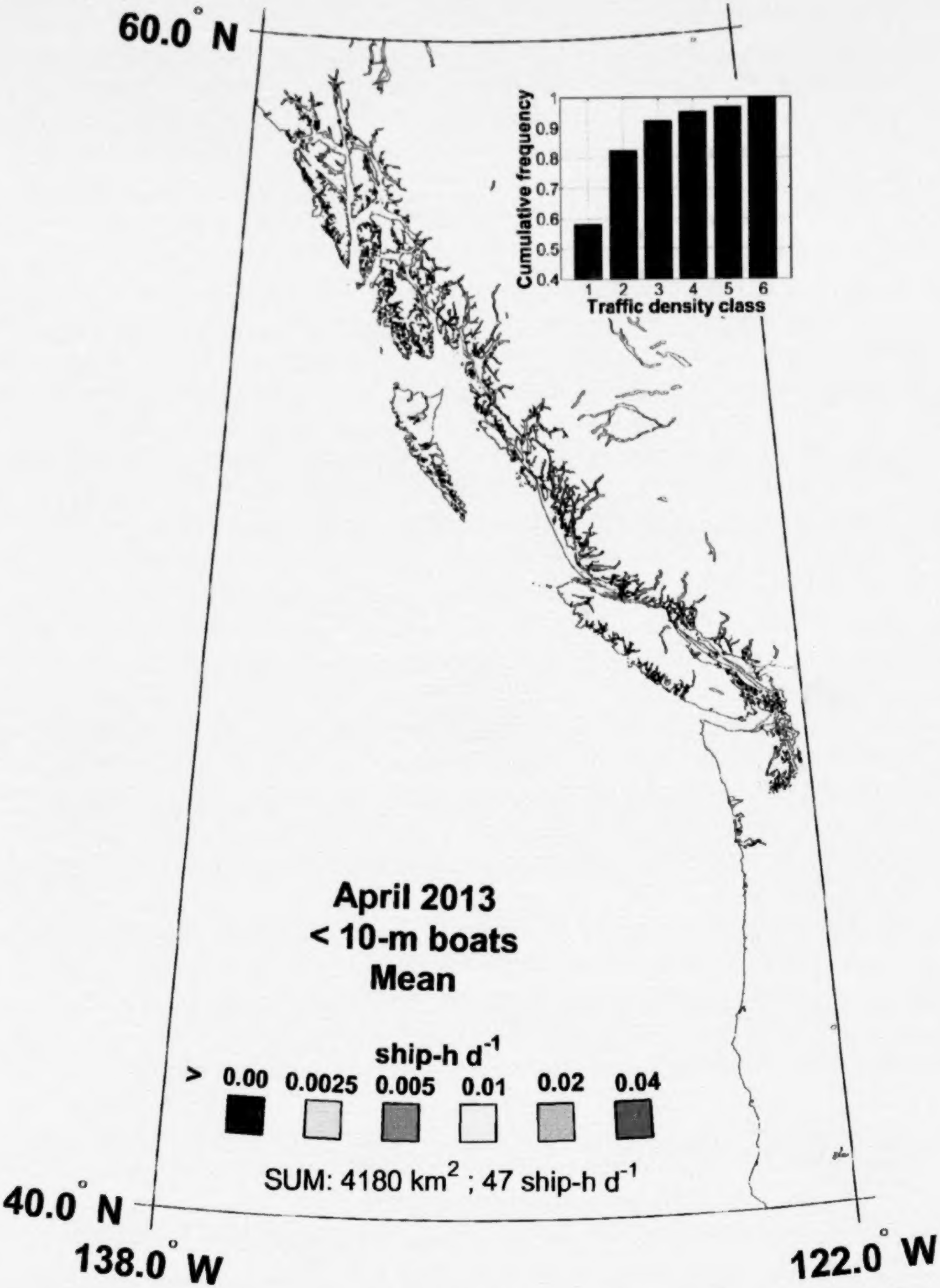

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 4180 km^2 ; 47 ship-h d^{-1}

Figure 108. Map of AIS mean traffic density of ships with lengths < 10 min April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

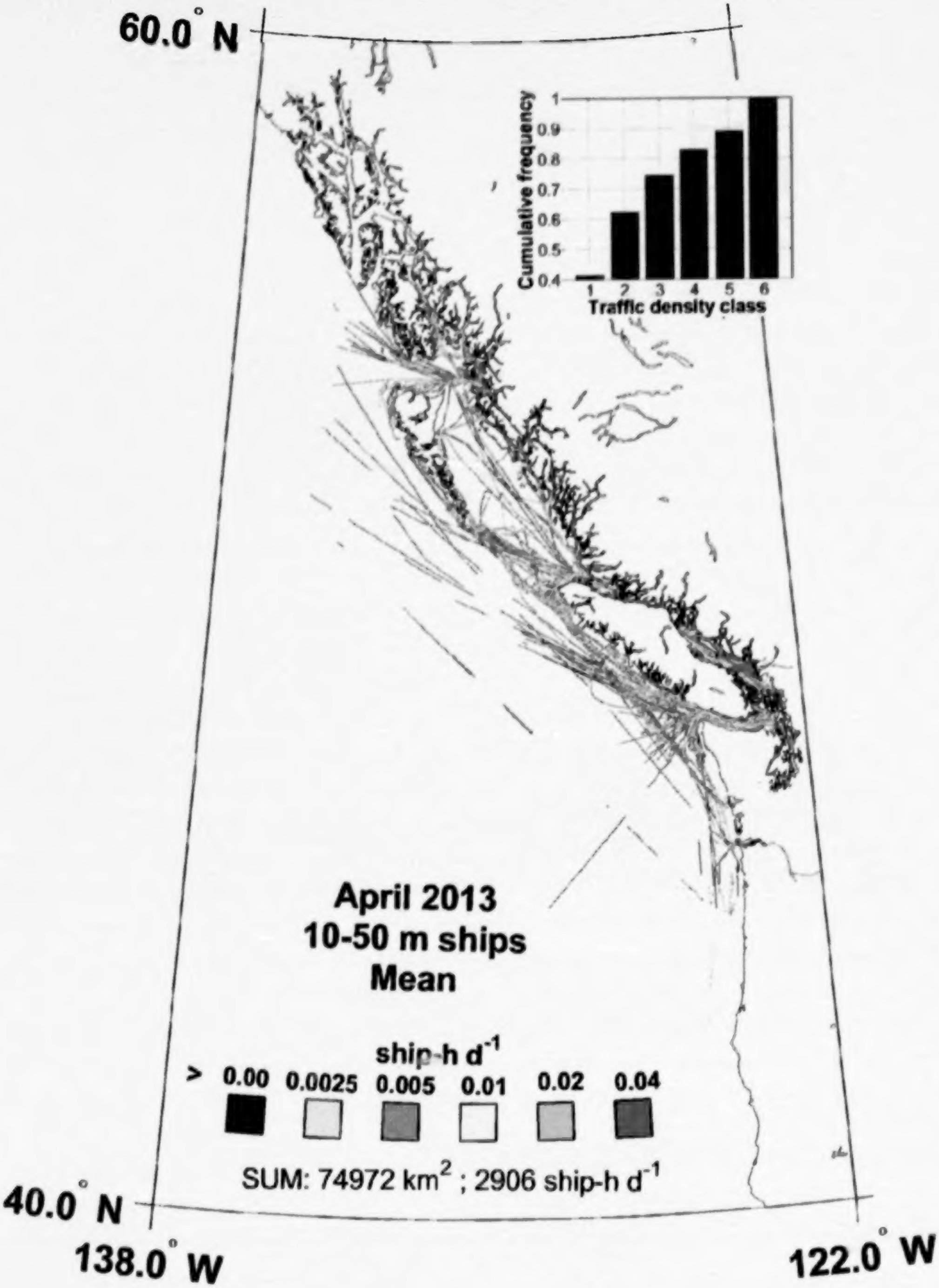

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
April 2013
10-50 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 74972 km^2 ; 2906 ship-h d^{-1}

Figure 109. Map of AIS mean traffic density of 10 to 50 m ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

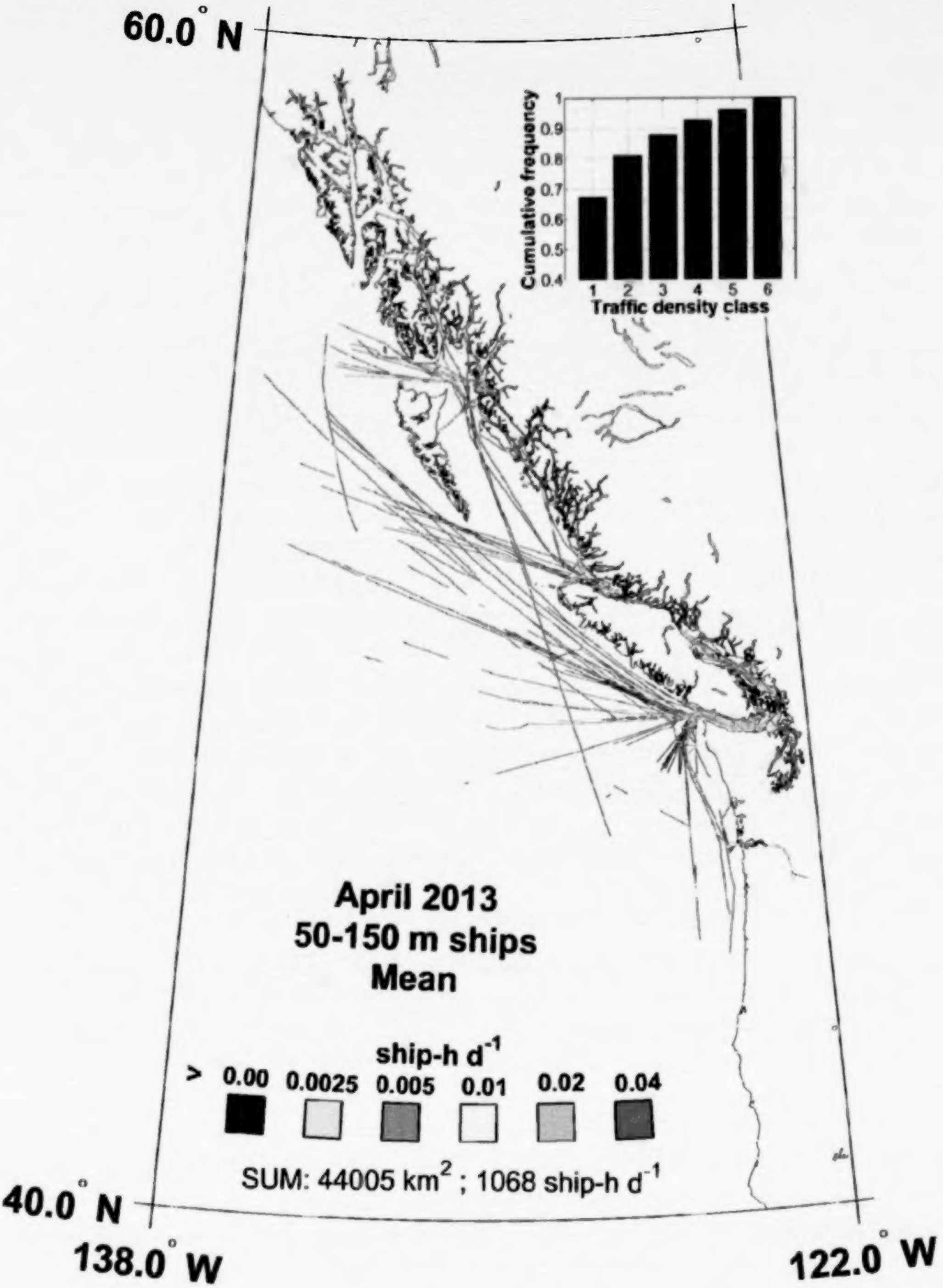

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
50-150 m ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 44005 km² ; 1068 ship-h d⁻¹

Figure 110. Map of AIS mean traffic density of 50 to 150 m ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

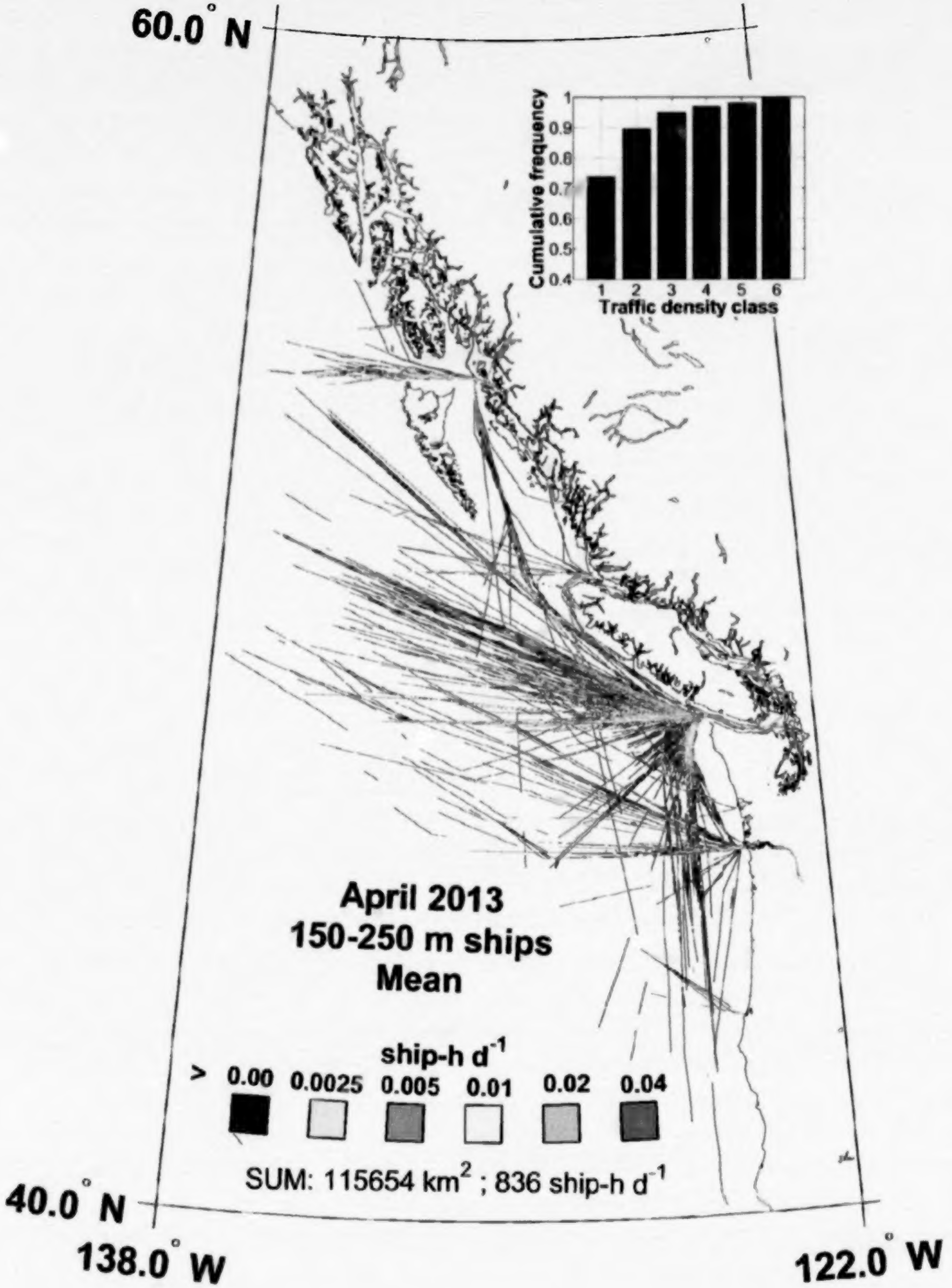

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 115654 km^2 ; 836 ship-h d^{-1}

Figure 111. Map of AIS mean traffic density of 150 to 250 m ships in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

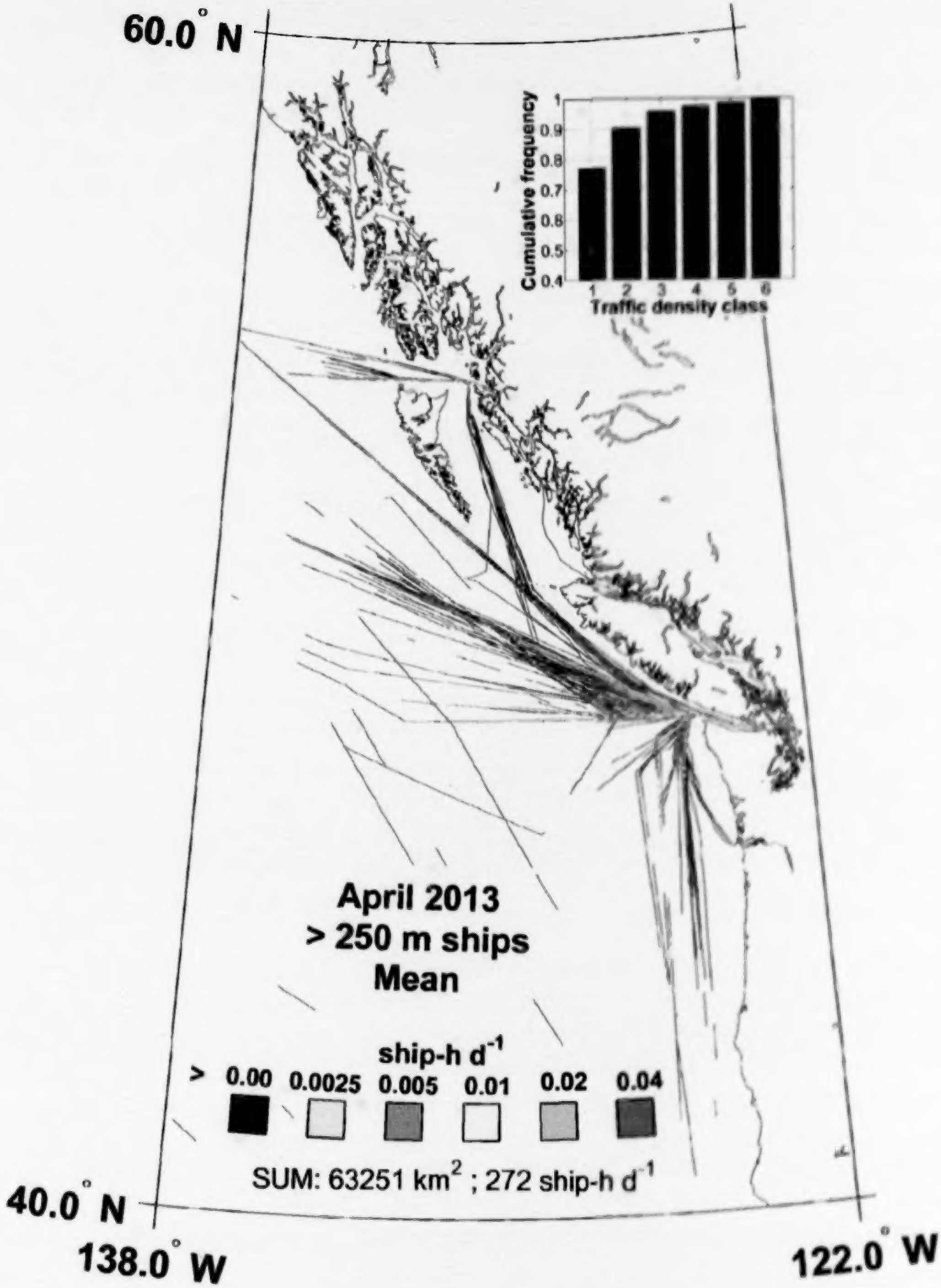

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
April 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 63251 km^2 ; 272 ship-h d^{-1}

Figure 112. Map of >250 m ship AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

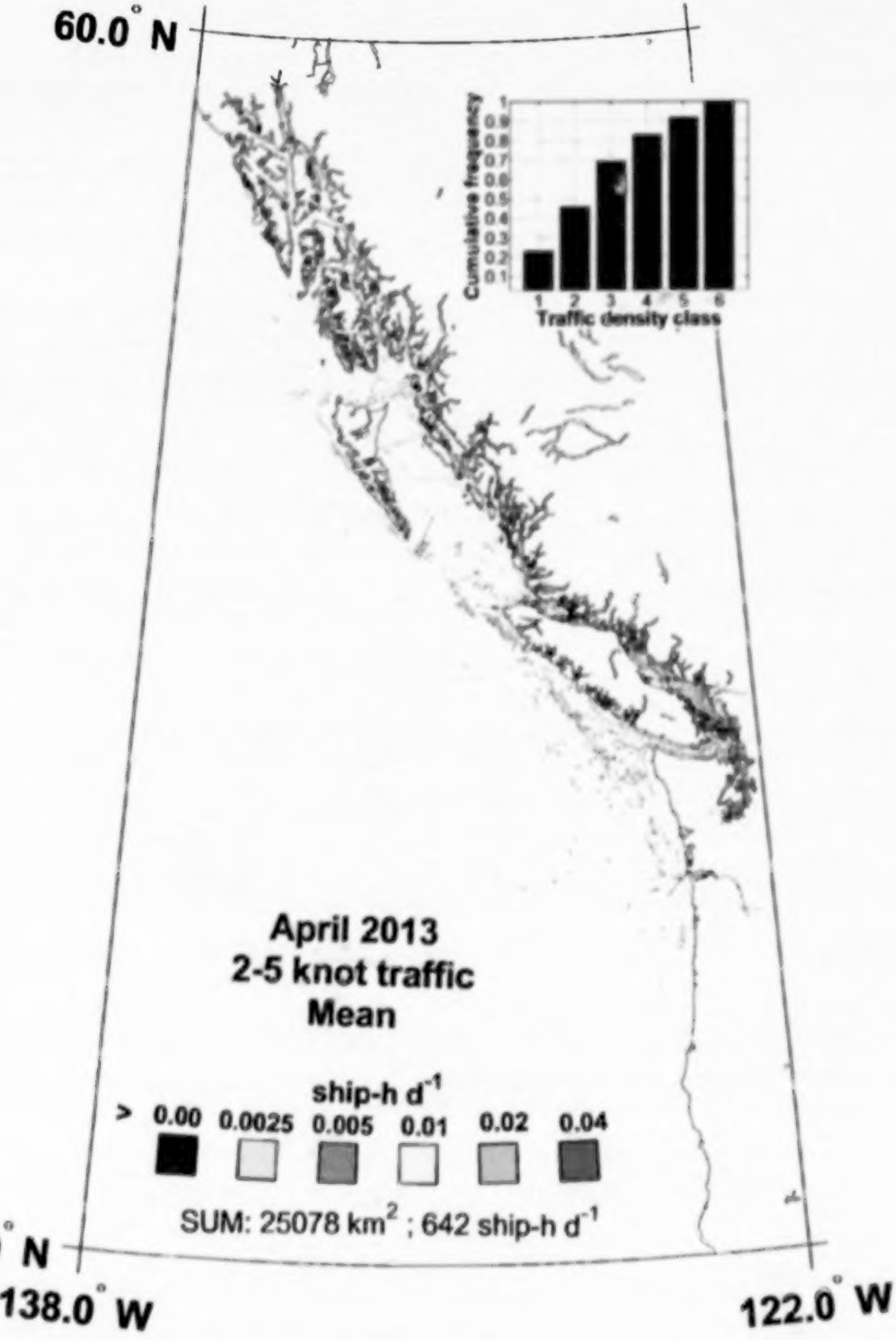

60.0° N
Cumulative frequency
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
April 2013
2-5 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 25078 km2 ; 642 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 113. Map of 2–5 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

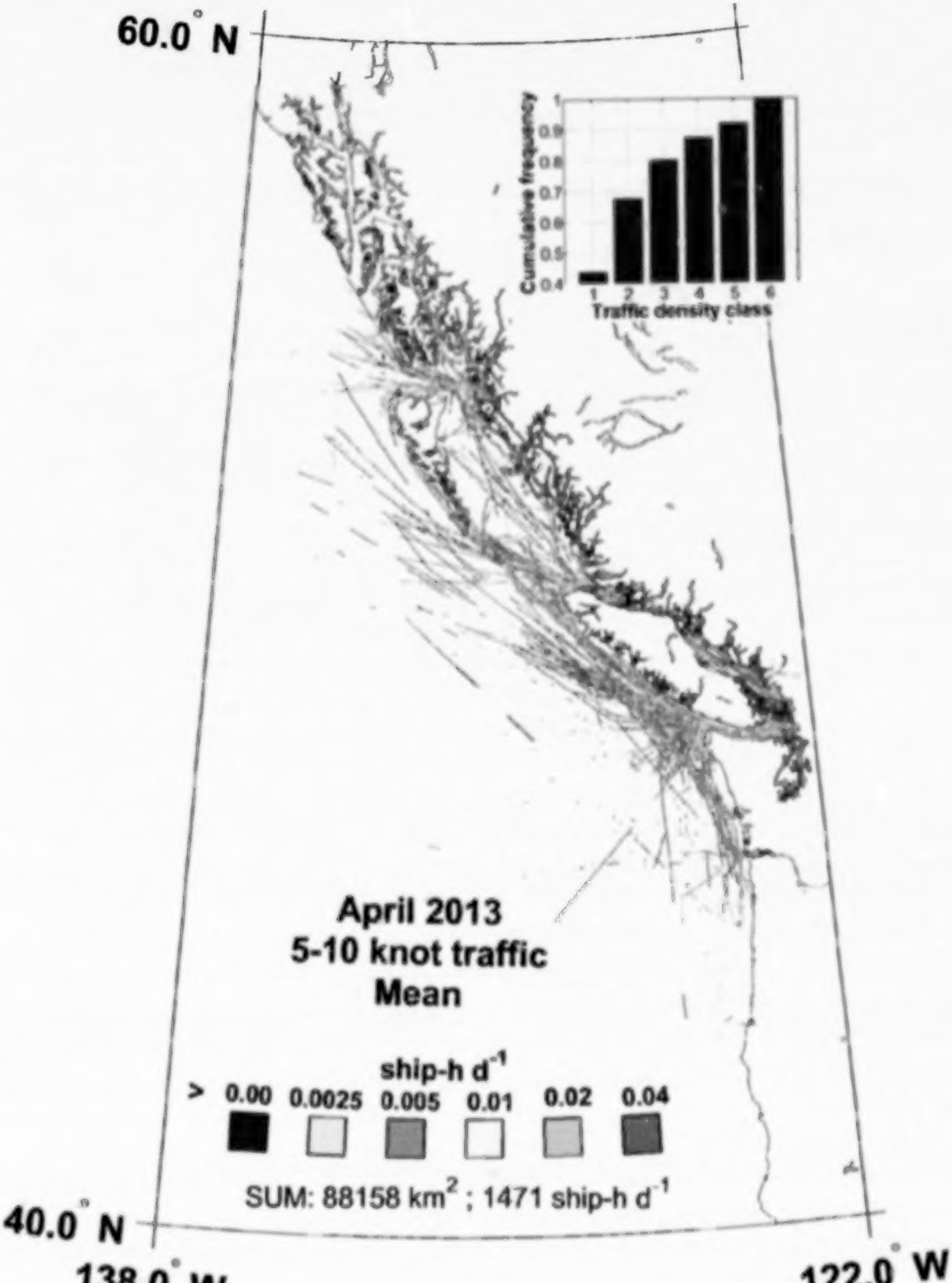

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
Traffic density class
1
2
3
4
5
6
0.4
0.5
0.6
0.7
0.8
0.9
1
April 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 88158 km^2 ; 1471 ship-h d^{-1}

Figure 114. Map of 5–10 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

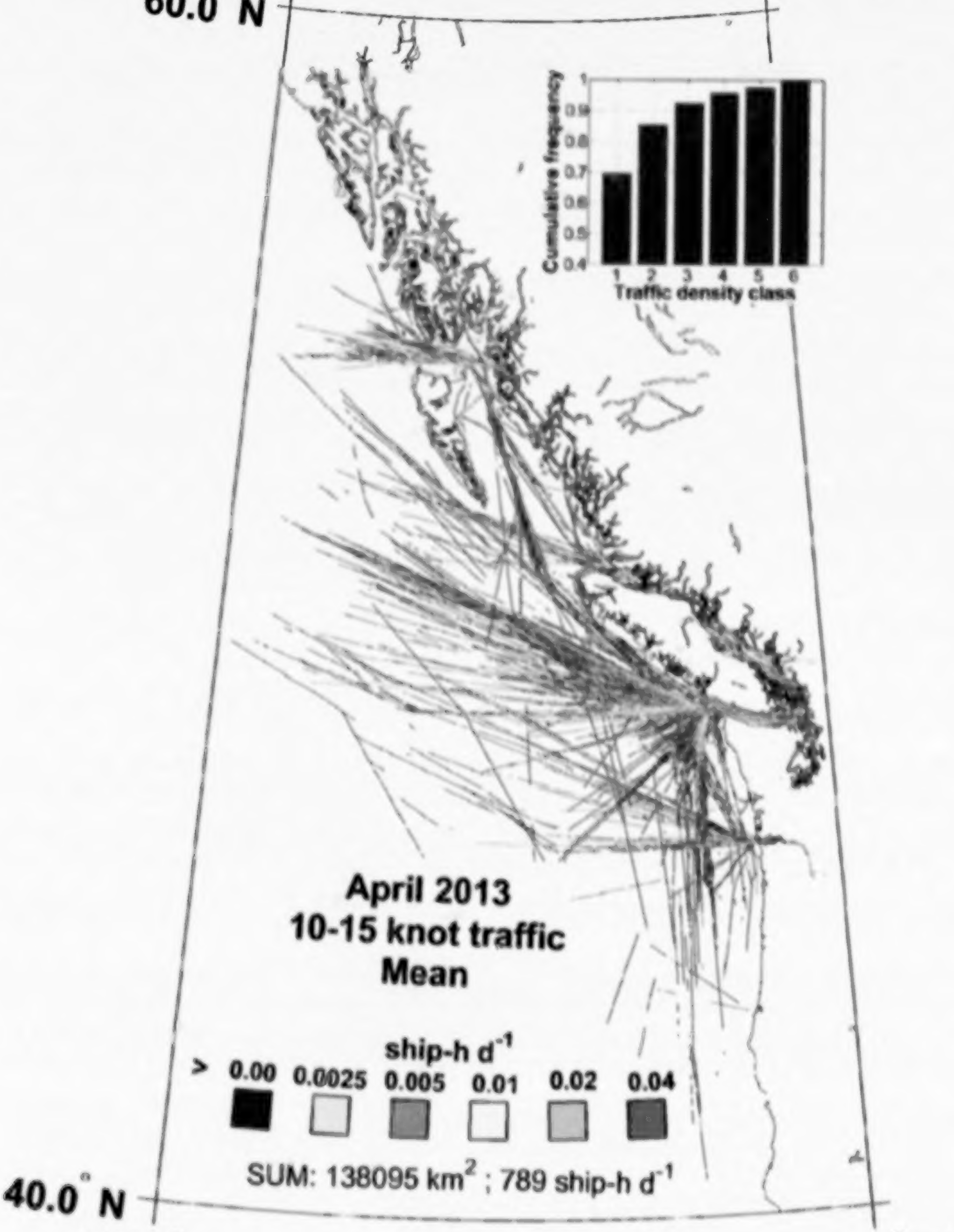

60.0° N
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
April 2013
10-15 knot traffic
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 138095 km² ; 789 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 115. Map of 10–15 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

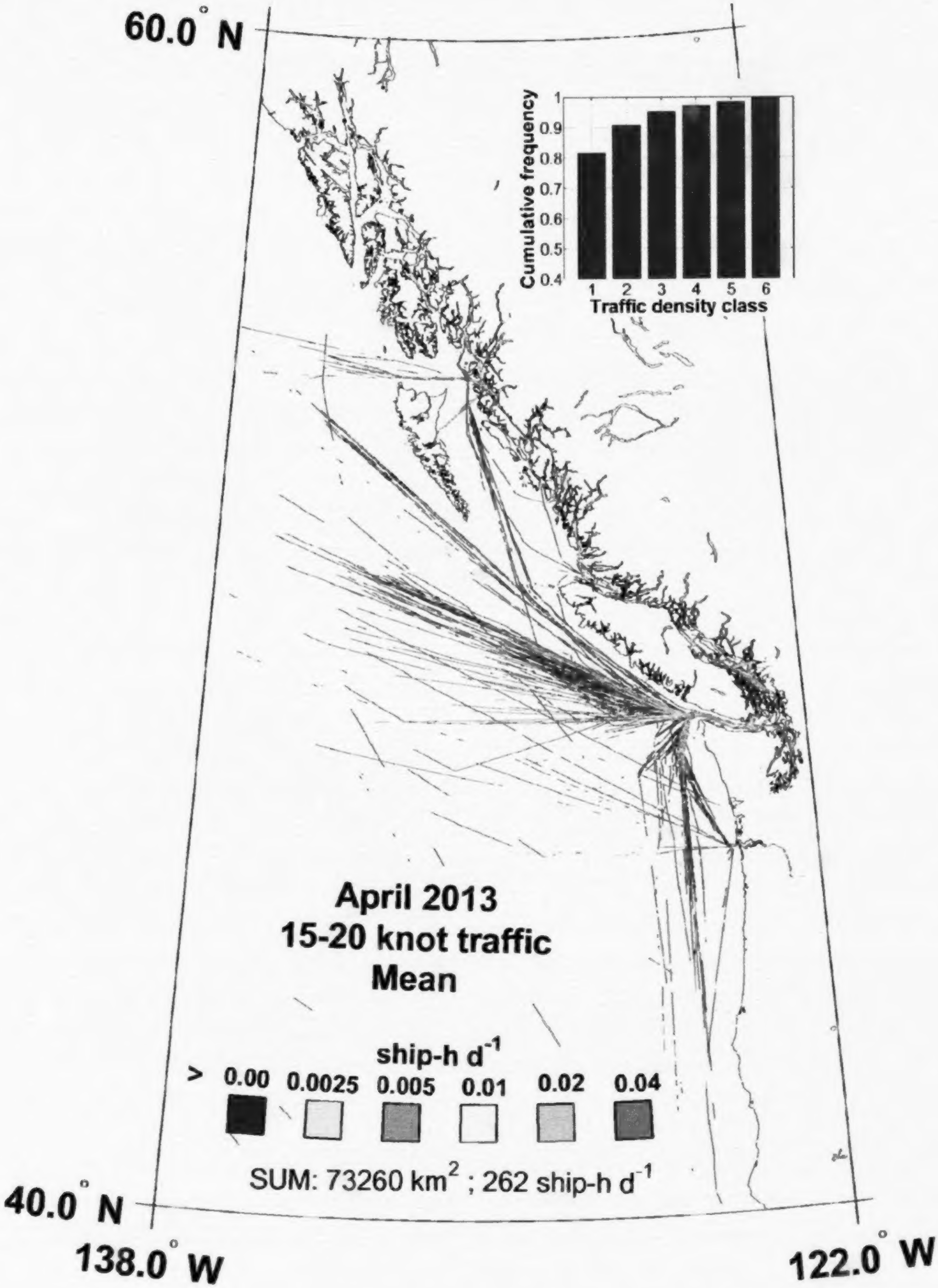

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 73260 km^2 ; 262 ship-h d^{-1}

Figure 116. Map of 15–20 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

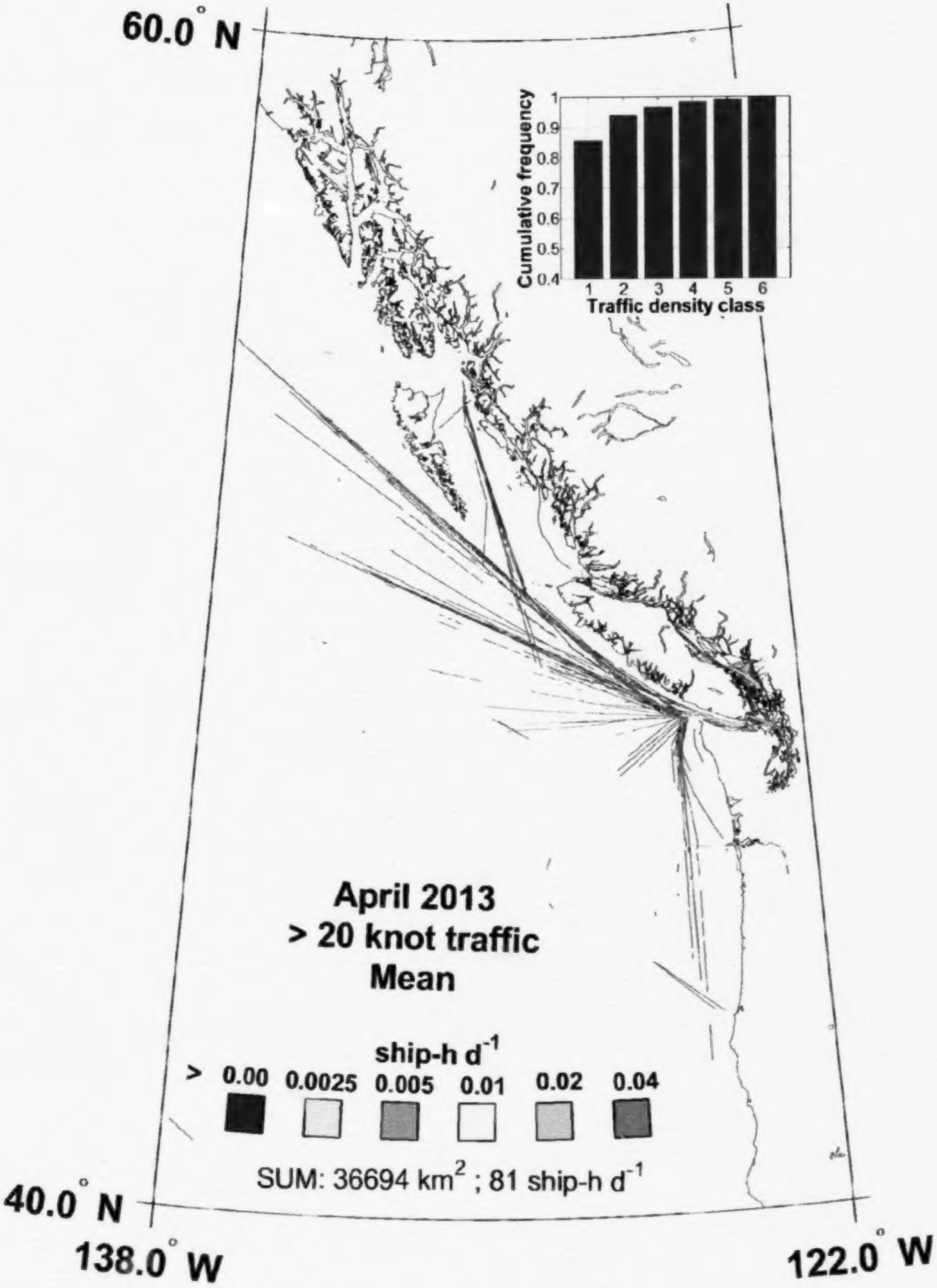

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
April 2013
> 20 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 36694 km2 ; 81 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 117. Map of >20 knot AIS mean traffic density in April 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.5. May 2013

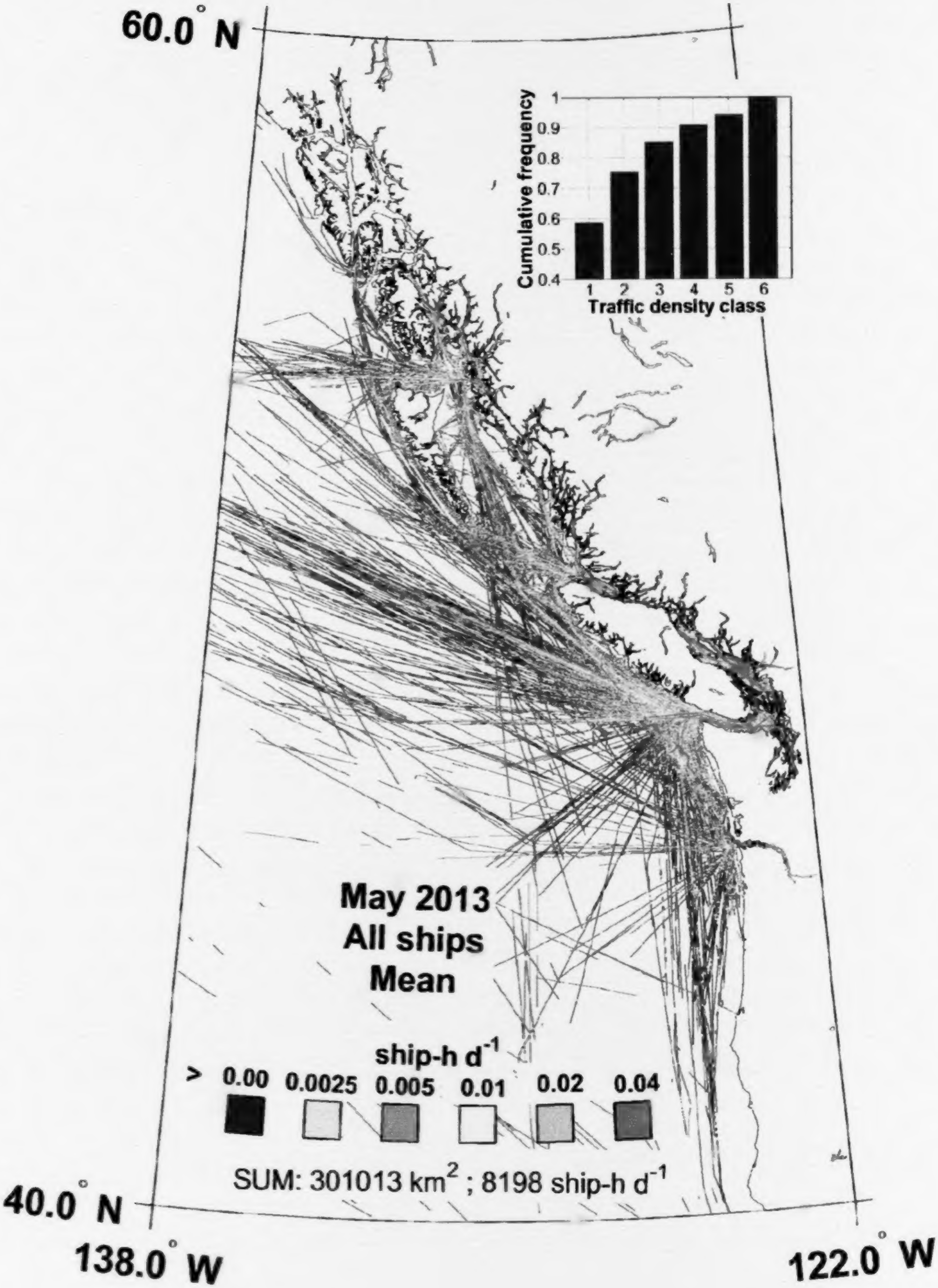

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
May 2013
All ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 301013 km^2 ; 8198 ship-h d^{-1}

Figure 118. Map of AIS mean traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

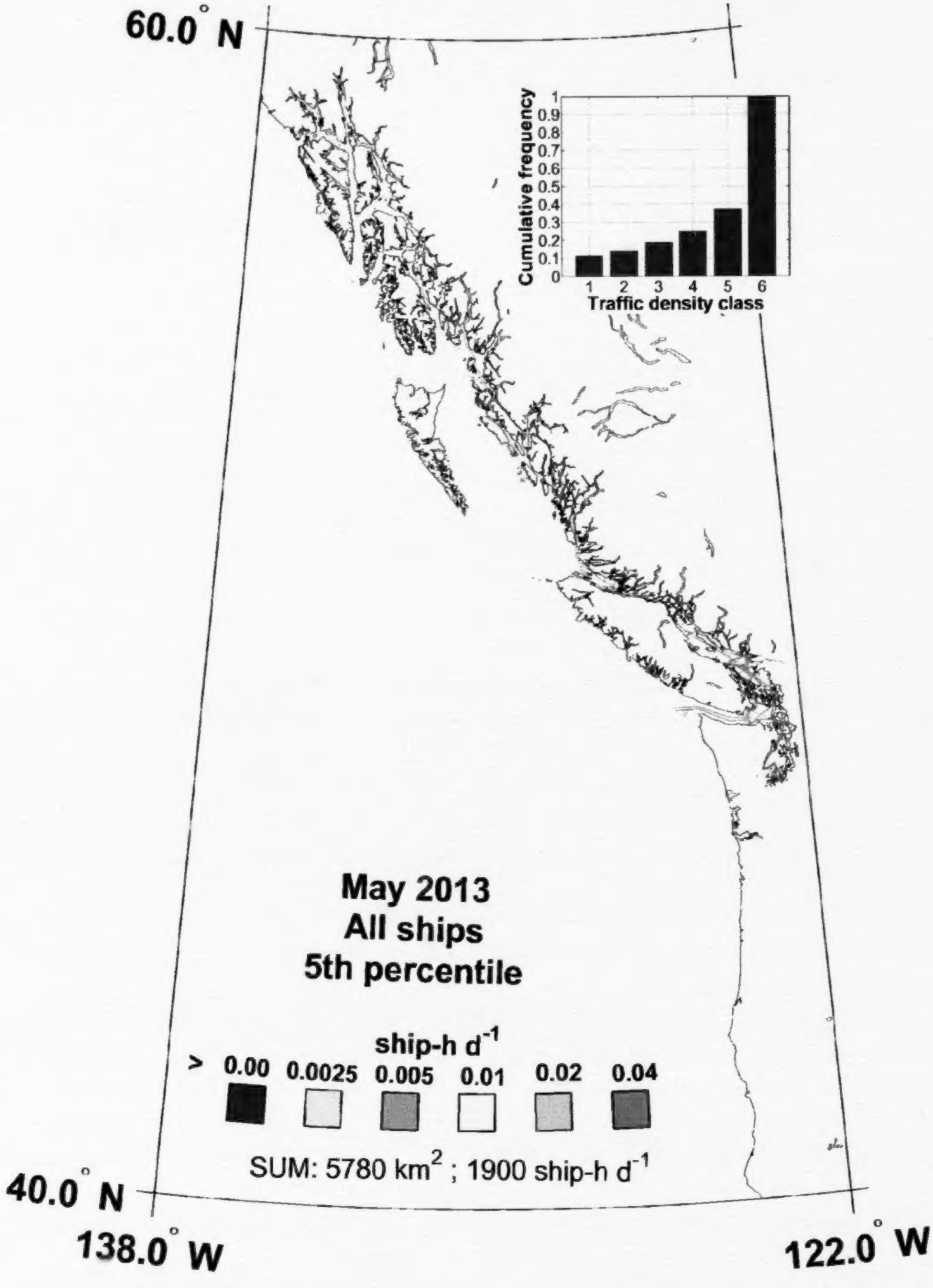

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
May 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 5780 km^2 ; 1900 ship-h d^{-1}

Figure 119. Map of the 5th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

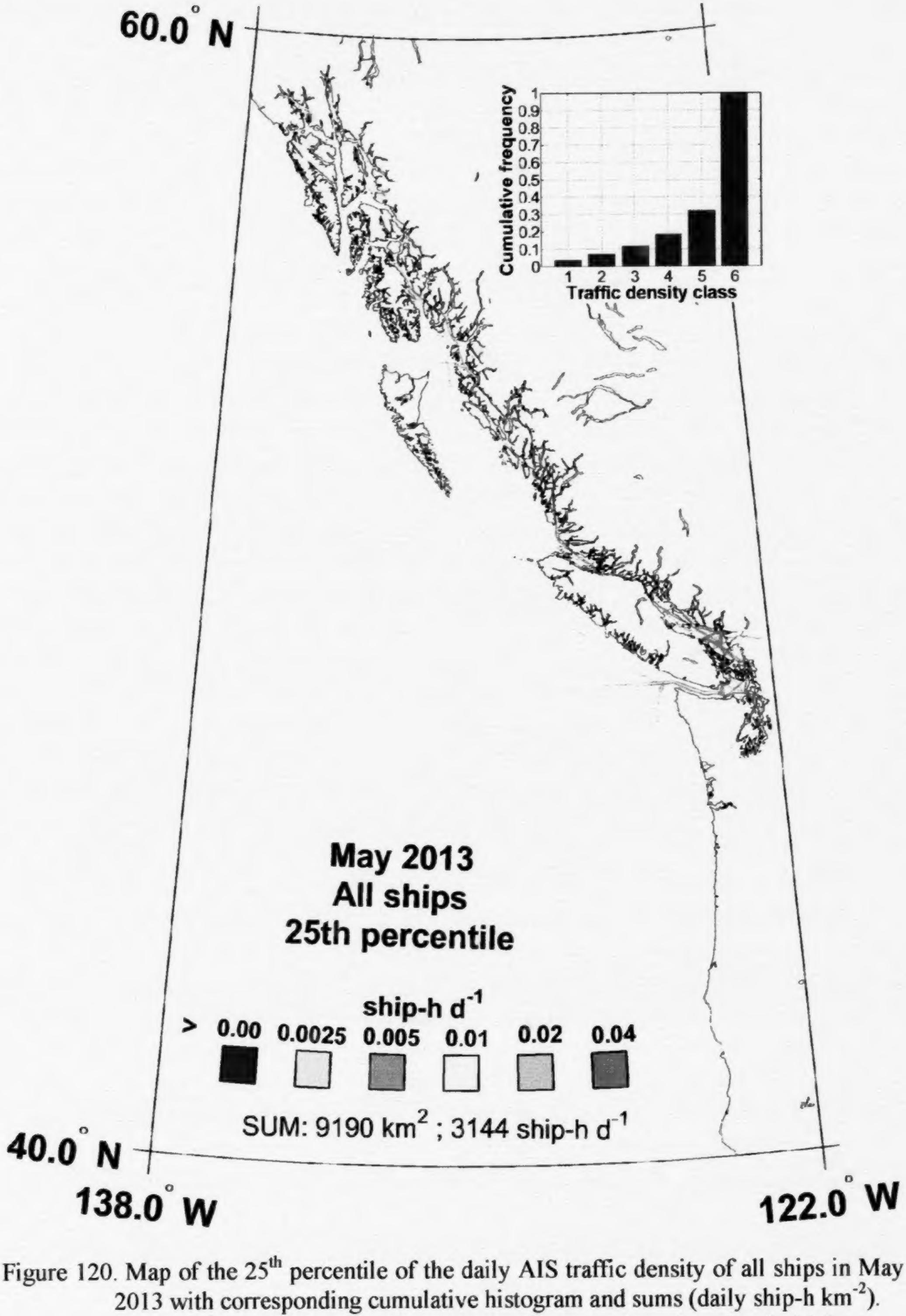

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
May 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 9190 km^2 ; 3144 ship-h d^{-1}

Figure 120. Map of the 25th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

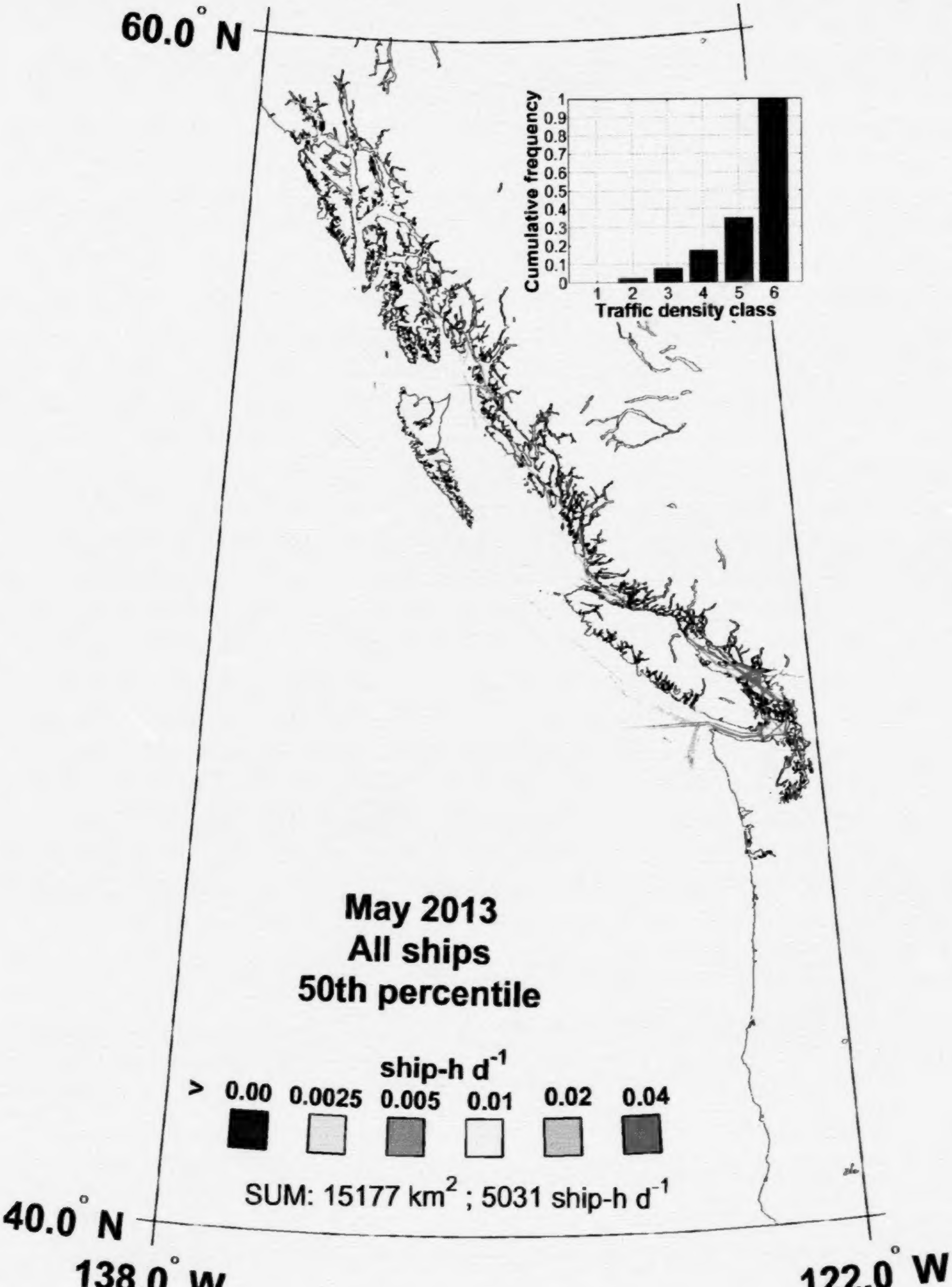

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
May 2013
All ships
50th percentile
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 15177 km2 ; 5031 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 121. Map of the 50th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

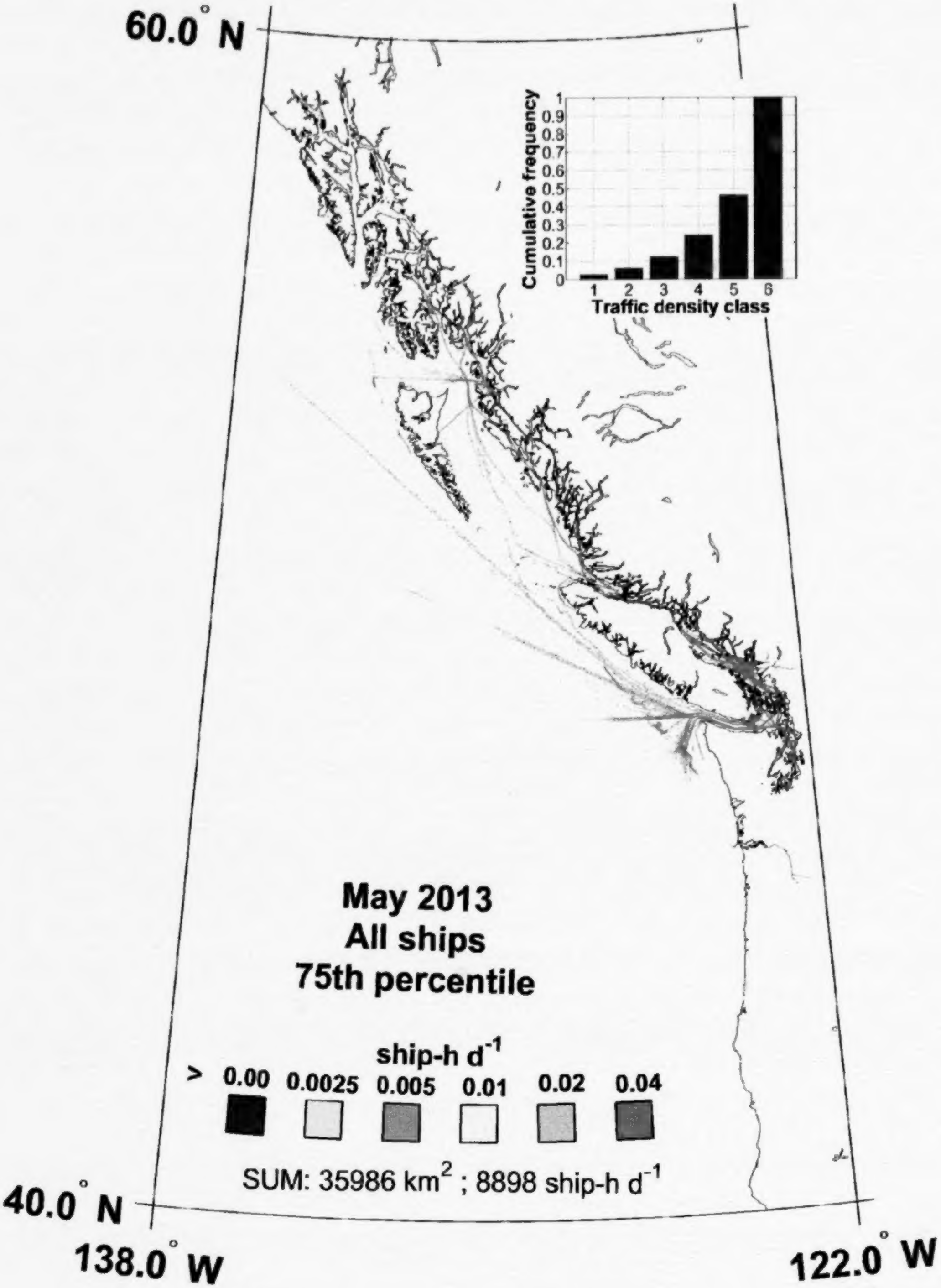

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
May 2013
All ships
75th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 35986 km2 ; 8898 ship-h d-1

Figure 122. Map of the 75th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

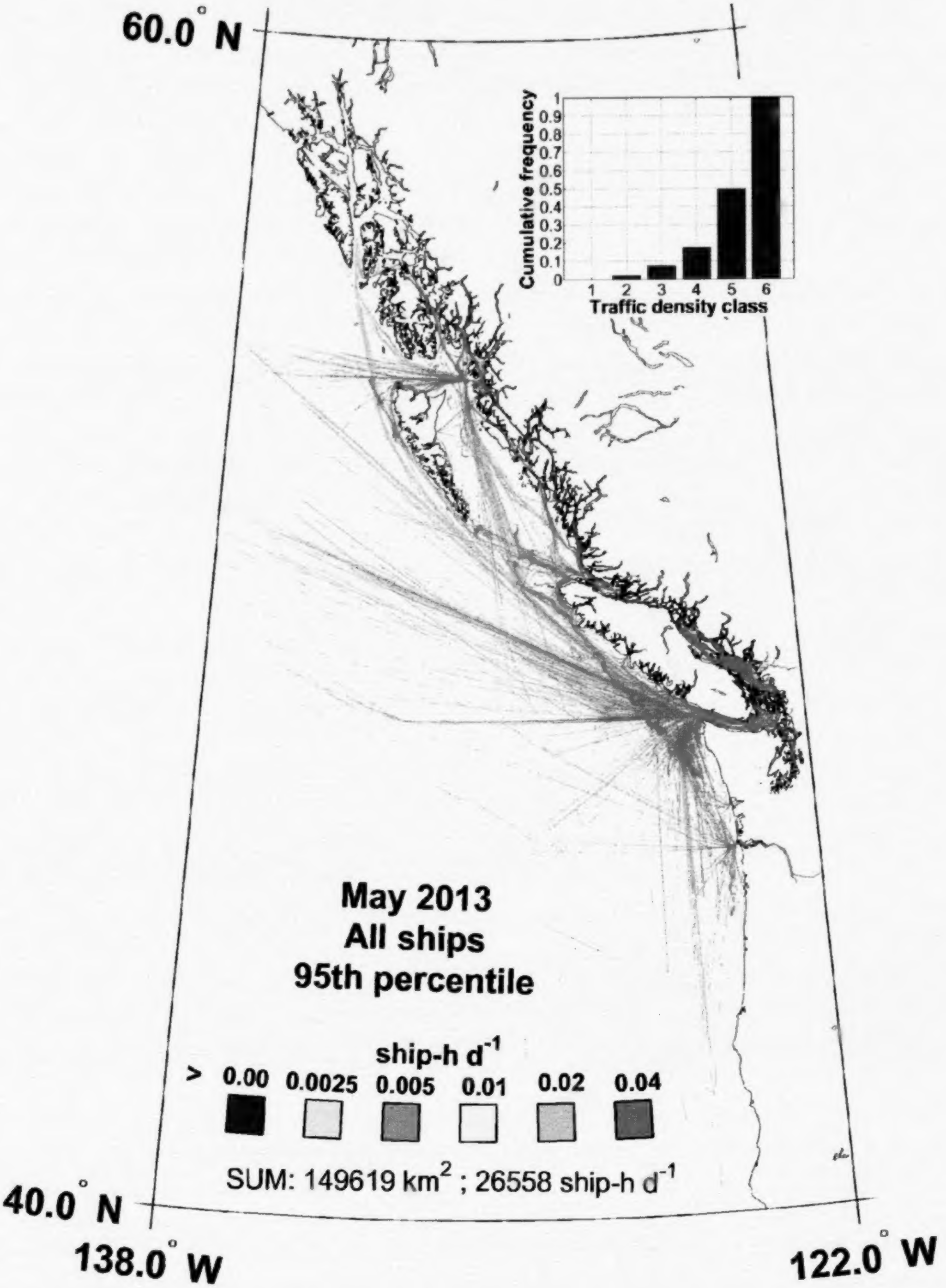

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
May 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 149619 km^2 ; 26558 ship-h d^{-1}

Figure 123. Map of the 95th percentile of the daily AIS traffic density of all ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

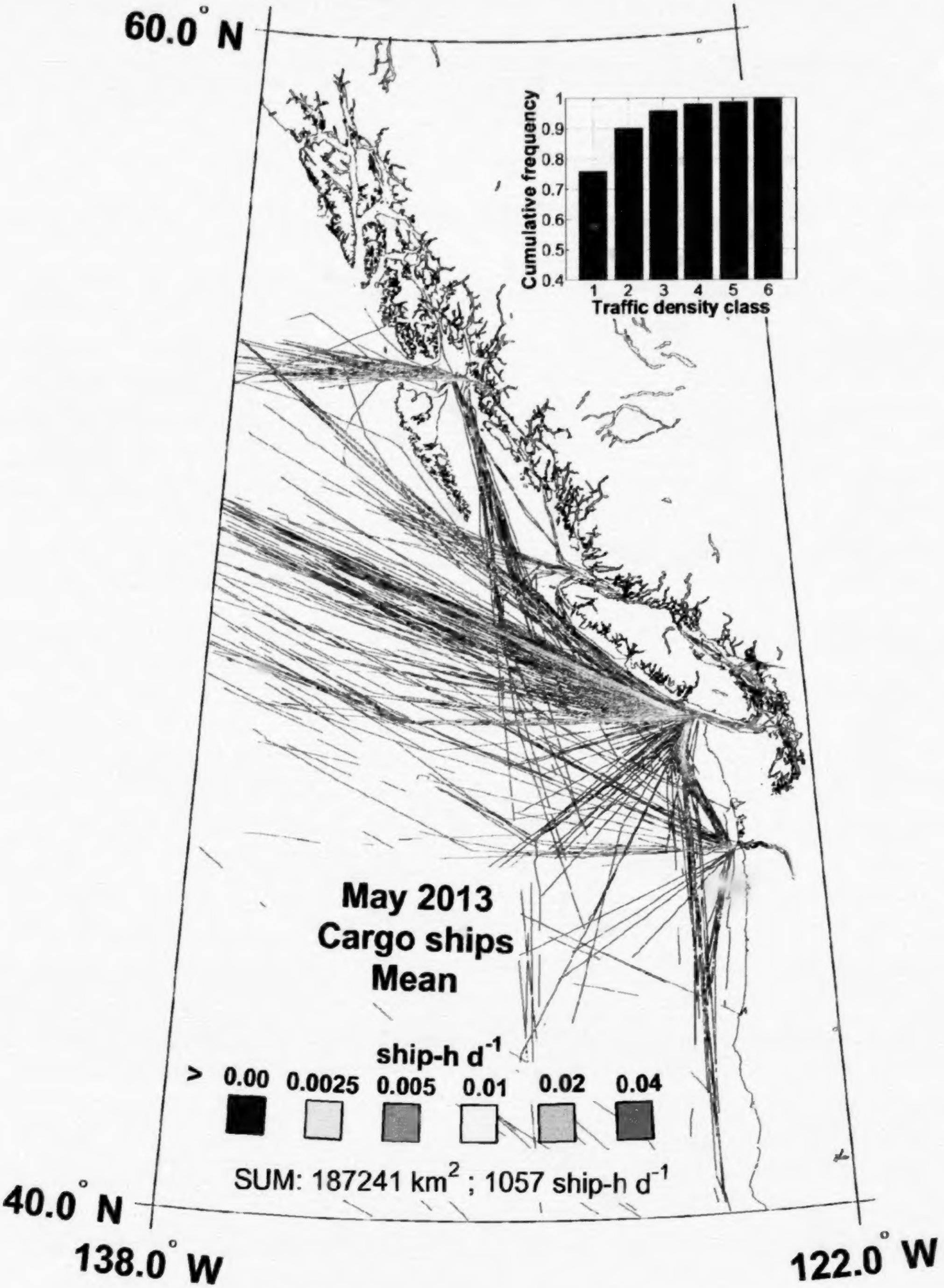

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 187241 km^2 ; 1057 ship-h d^{-1}

Figure 124. Map of AIS mean traffic density of cargo-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

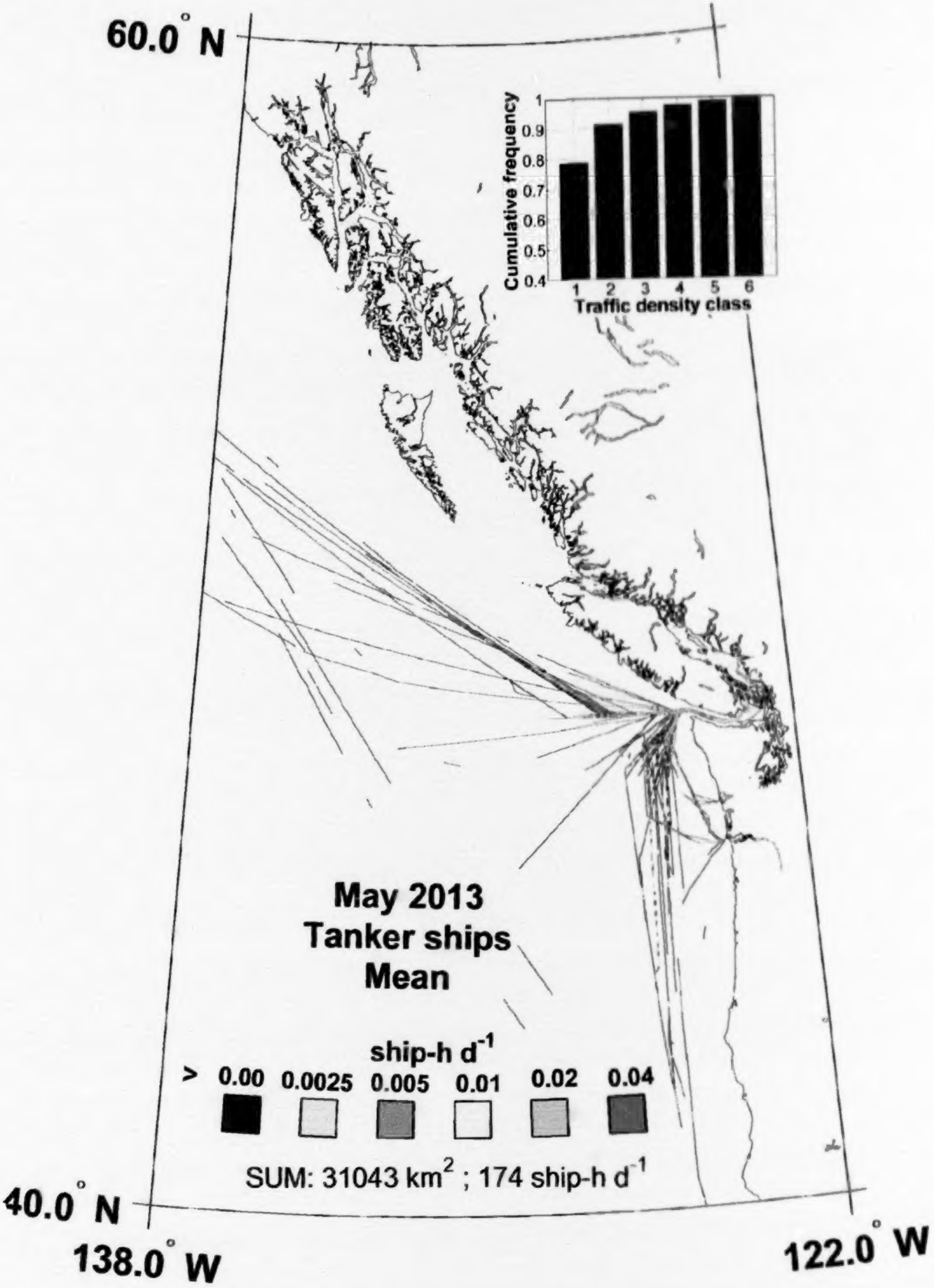

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
Tanker ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 31043 km² ; 174 ship-h d⁻¹

Figure 125. Map of AIS mean traffic density of tanker-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

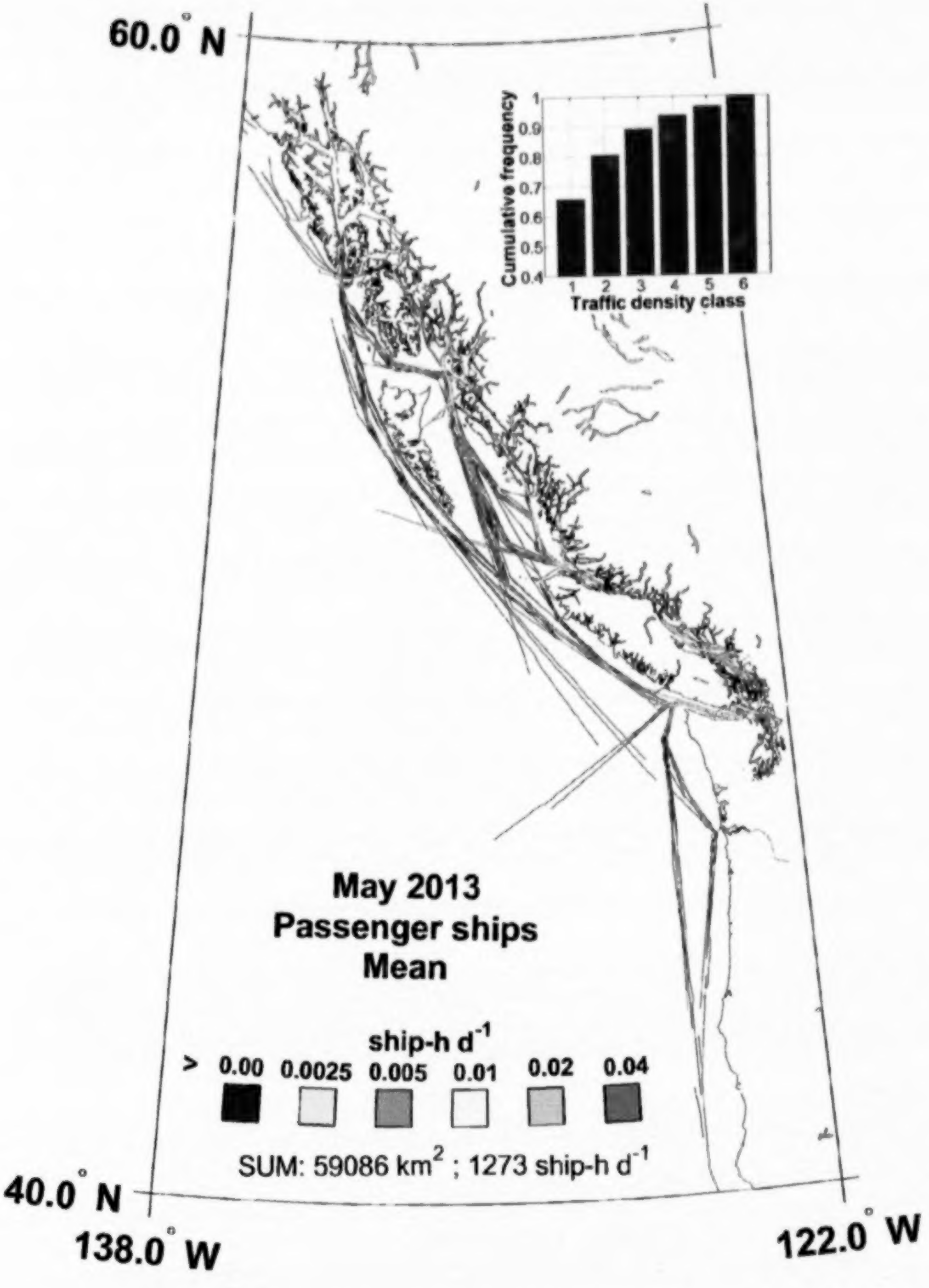

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
May 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 59086 km^2 ; 1273 ship-h d^{-1}

Figure 126. Map of AIS mean traffic density of passenger-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

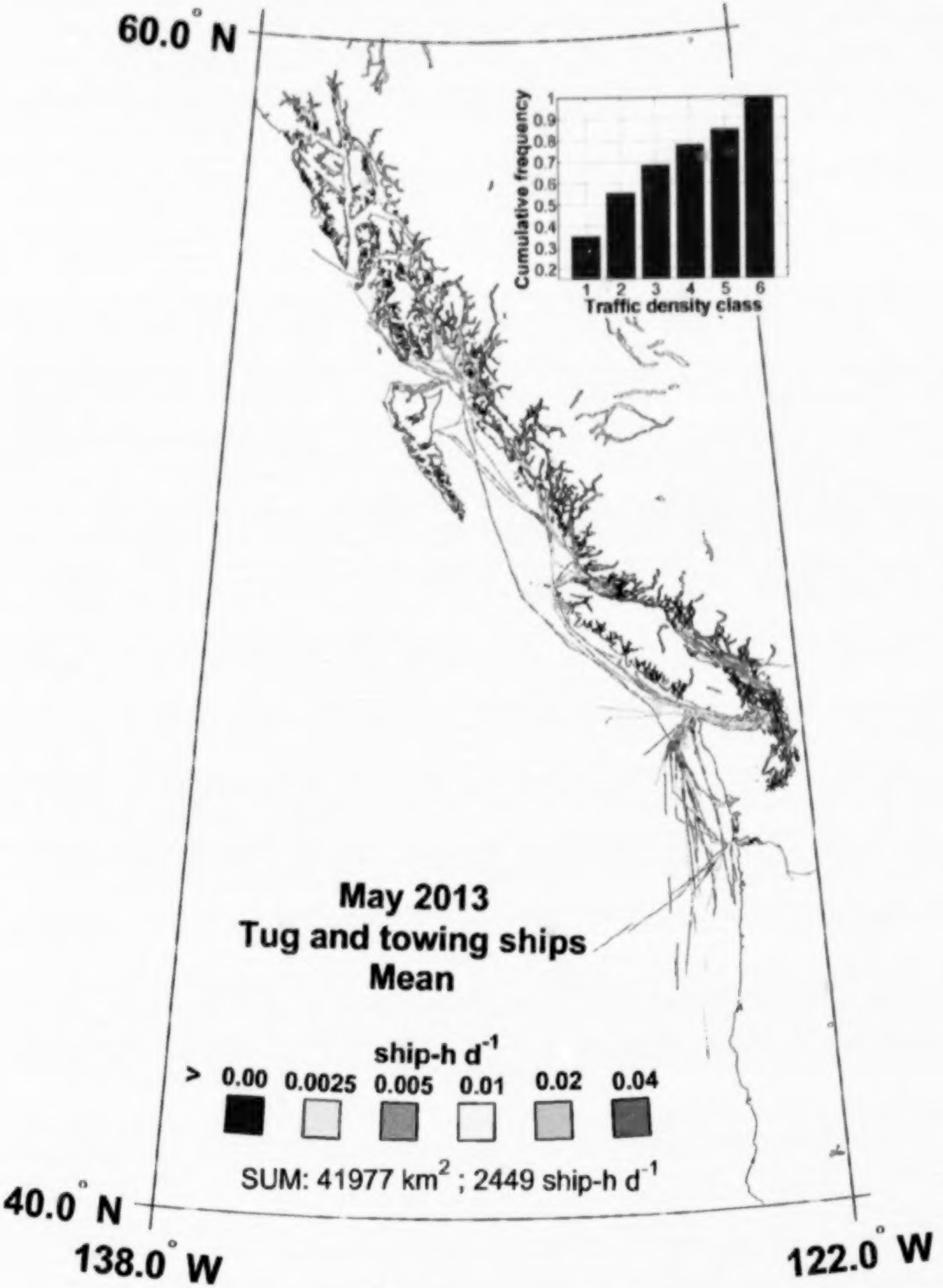

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
May 2013
Tug and towing ships
Mean
ship-h d^-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 41977 km^2 ; 2449 ship-h d^-1

Figure 127. Map of AIS mean traffic density of tug and towing -type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

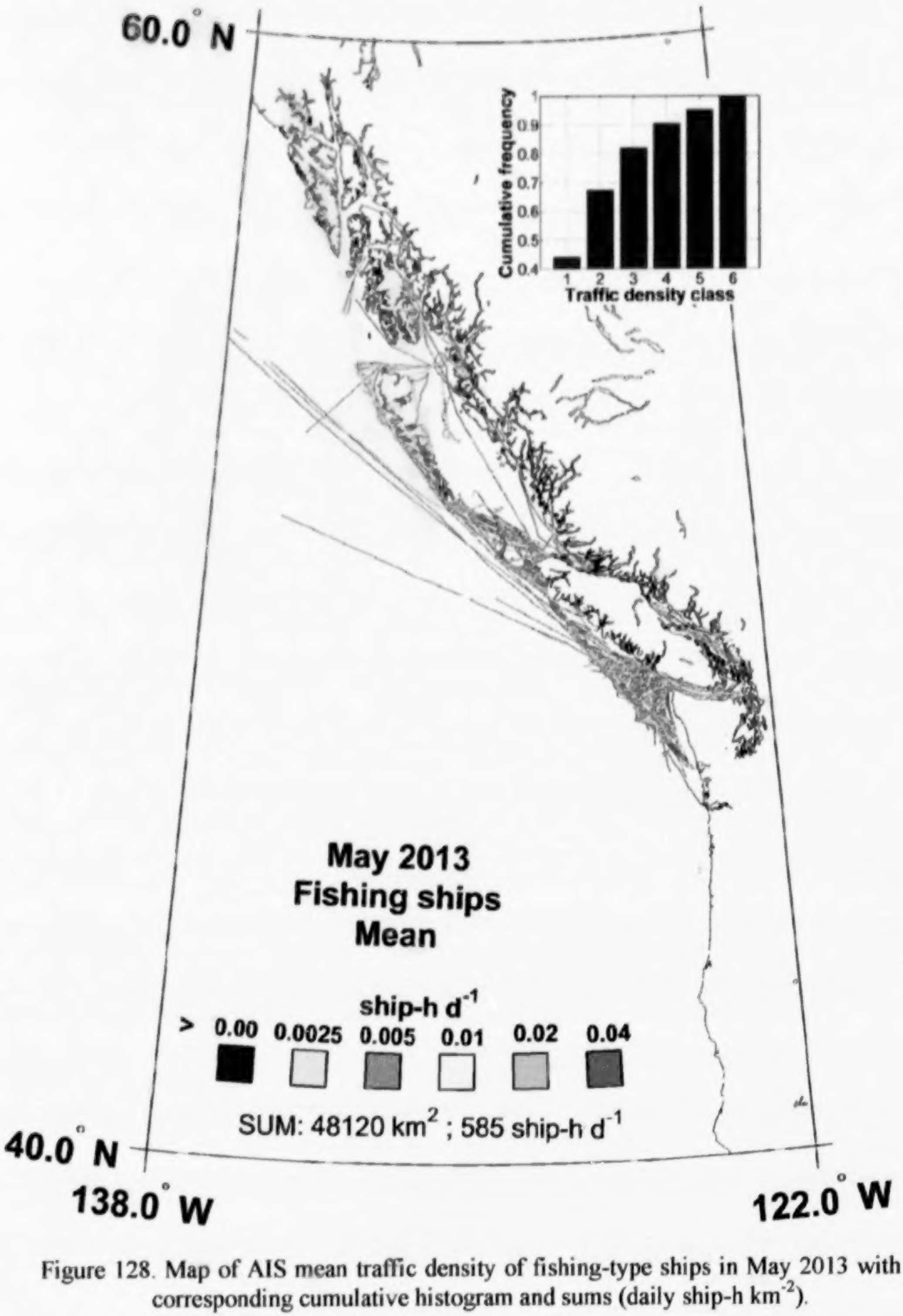

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 48120 km^2 ; 585 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 128. Map of AIS mean traffic density of fishing-type ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

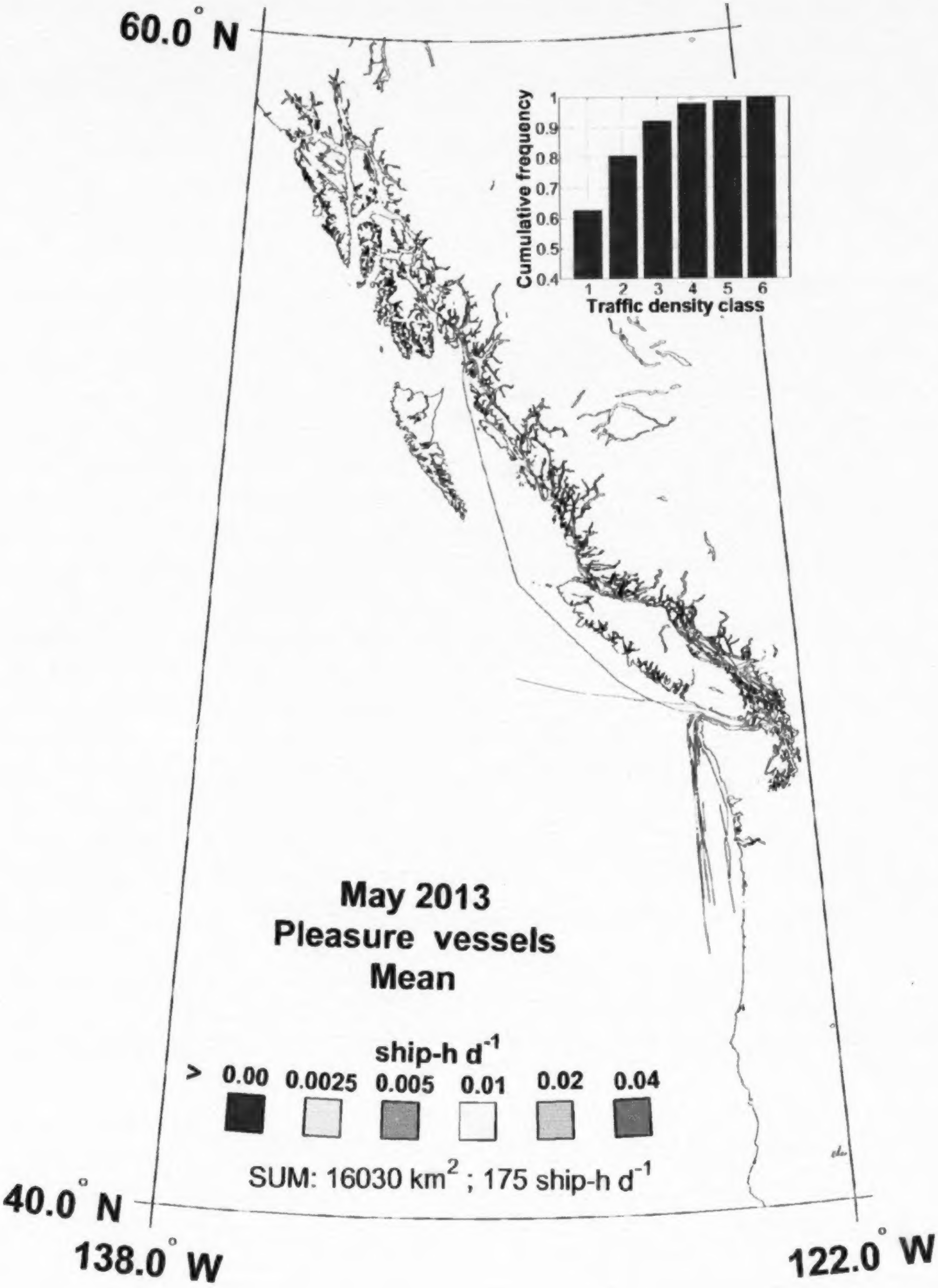

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
May 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 16030 km^2 ; 175 ship-h d^{-1}

Figure 129. Map of AIS mean traffic density of pleasure-type vessels in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

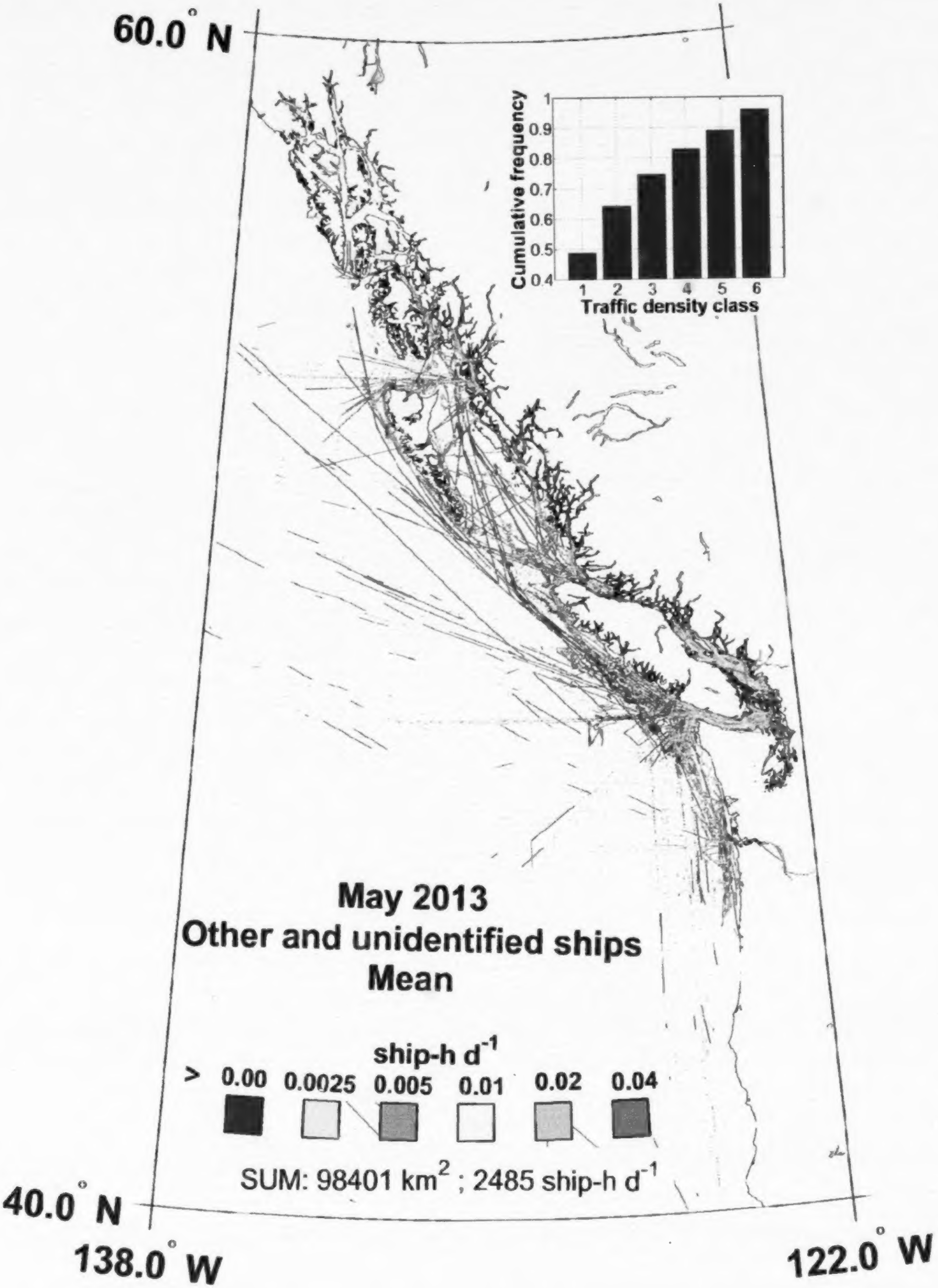

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 98401 km^2 ; 2485 ship-h d^{-1}

Figure 130. Map of AIS mean traffic density of other type of ships and ships of unidentified type in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

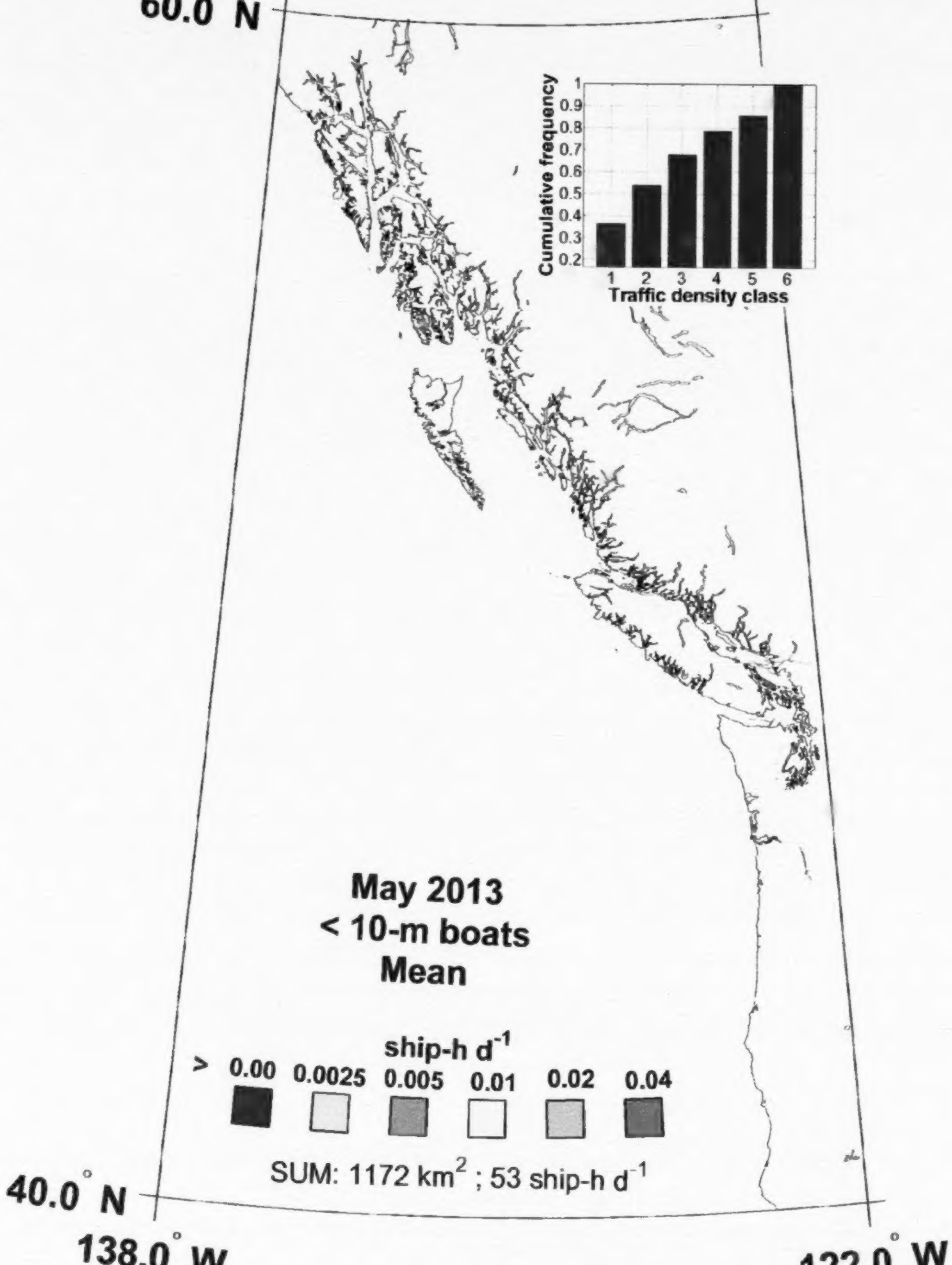

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
May 2013
< 10-m boats
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 1172 km² ; 53 ship-h d⁻¹

Figure 131. Map of AIS mean traffic density of ships with lengths < 10 min May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

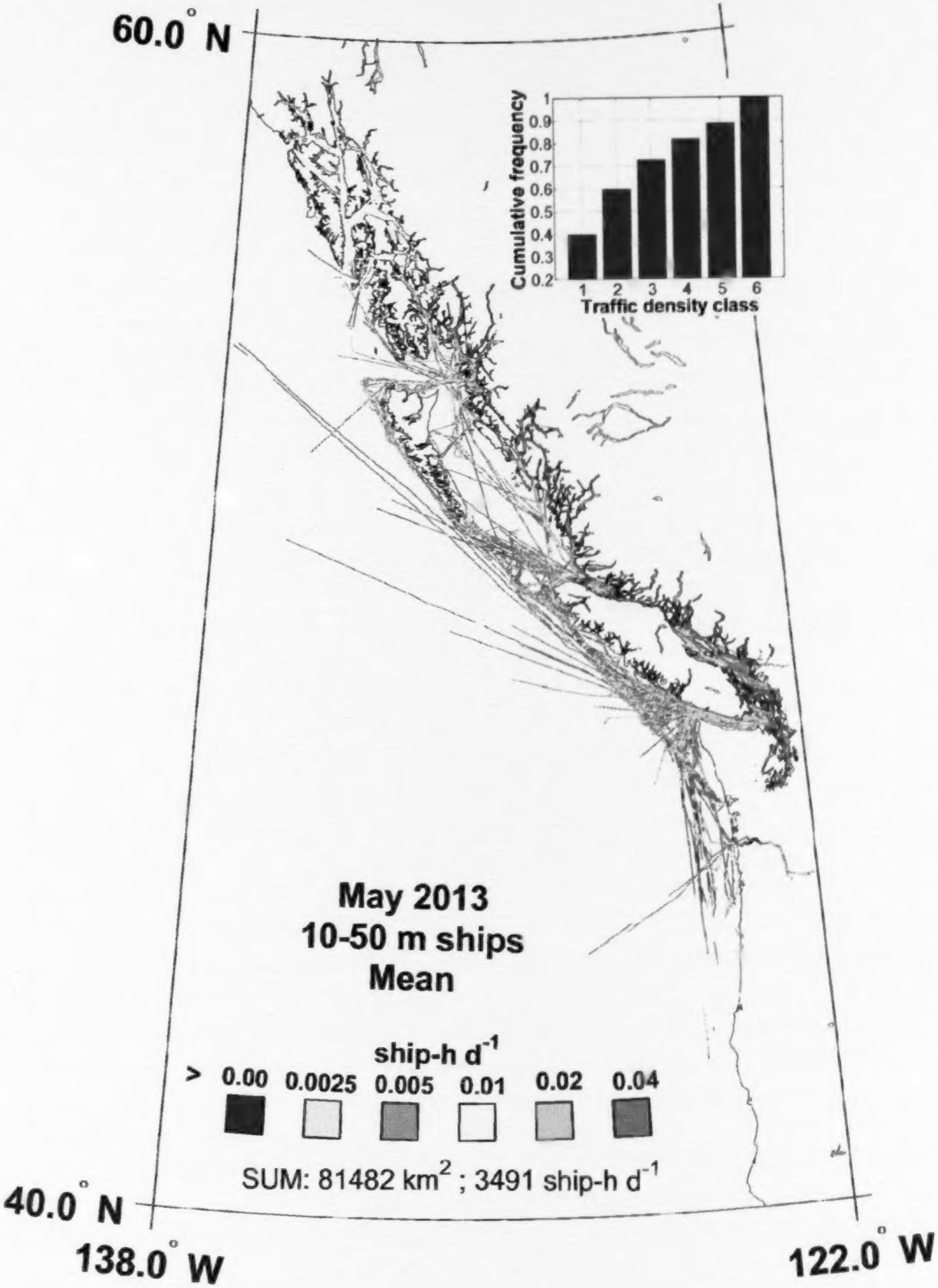

60.0° N
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
May 2013
10-50 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 81482 km^2 ; 3491 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 132. Map of AIS mean traffic density of 10 to 50 m ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

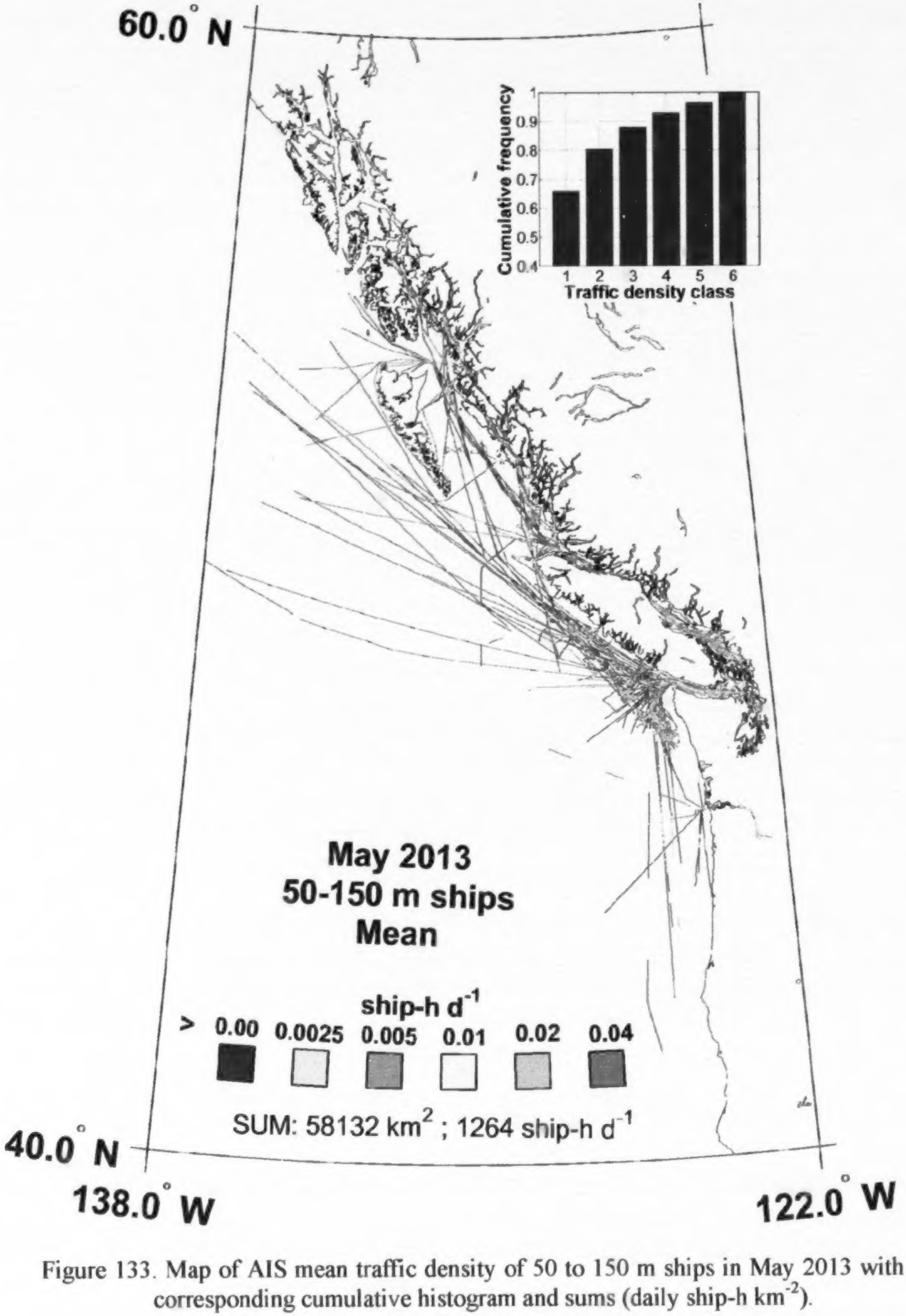

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
May 2013
50-150 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 58132 km² ; 1264 ship-h d⁻¹

Figure 133. Map of AIS mean traffic density of 50 to 150 m ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

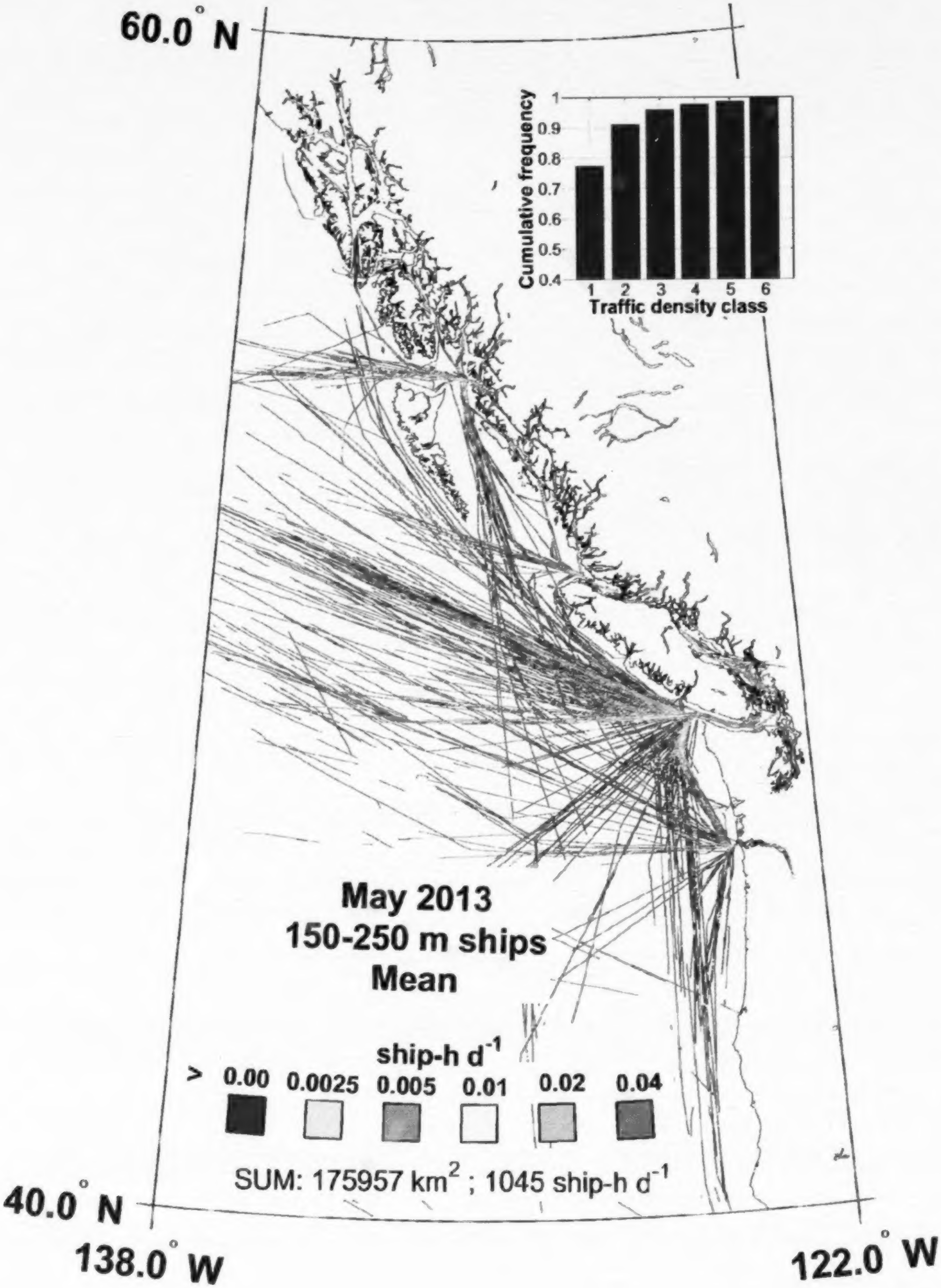

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 175957 km^2 ; 1045 ship-h d^{-1}

Figure 134. Map of AIS mean traffic density of 150 to 250 m ships in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

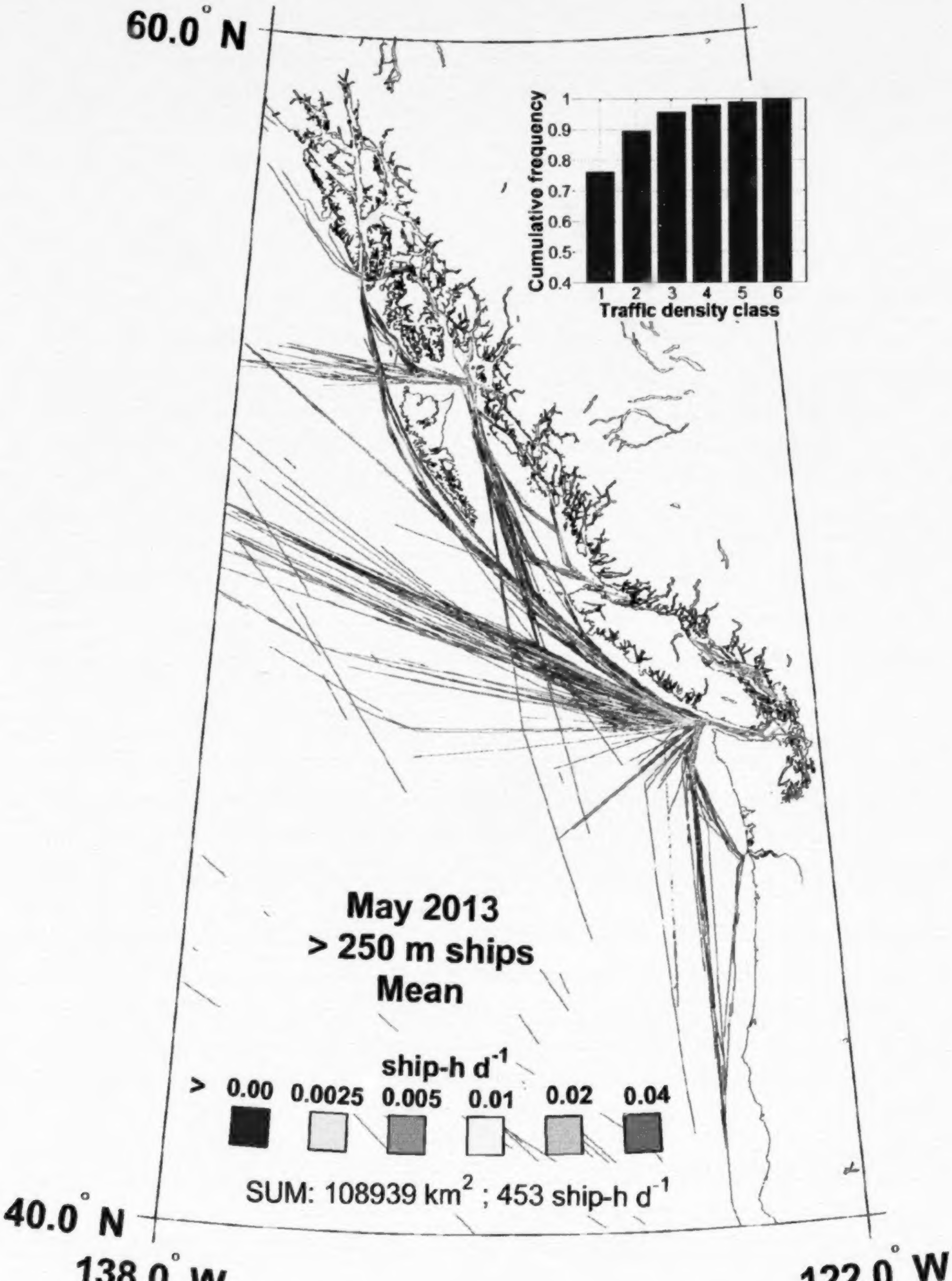

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 108939 km^2 ; 453 ship-h d^{-1}

Figure 135. Map of >250 m ship AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

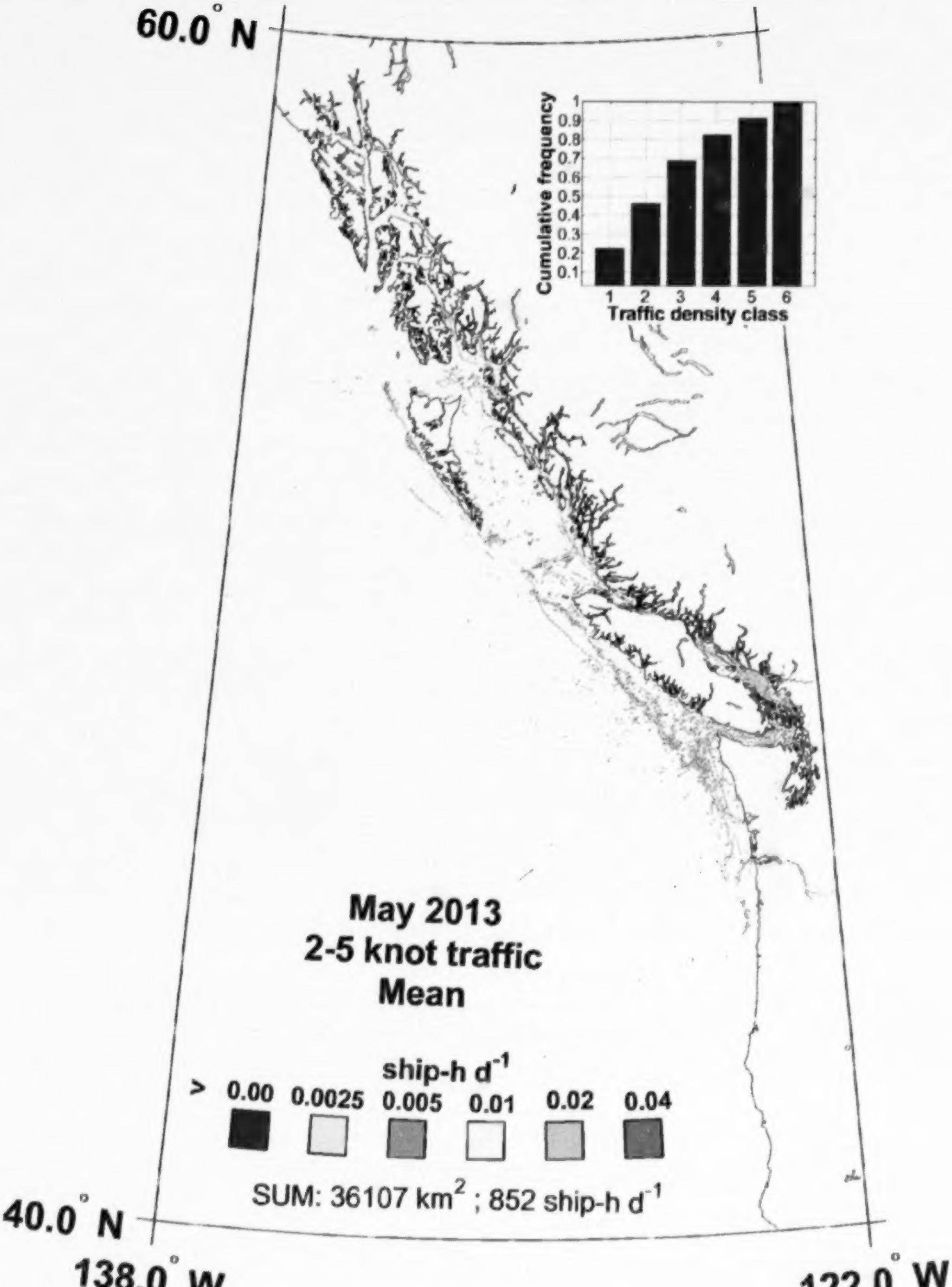

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
May 2013
2-5 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 36107 km^2 ; 852 ship-h d^{-1}

Figure 136. Map of 2–5 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

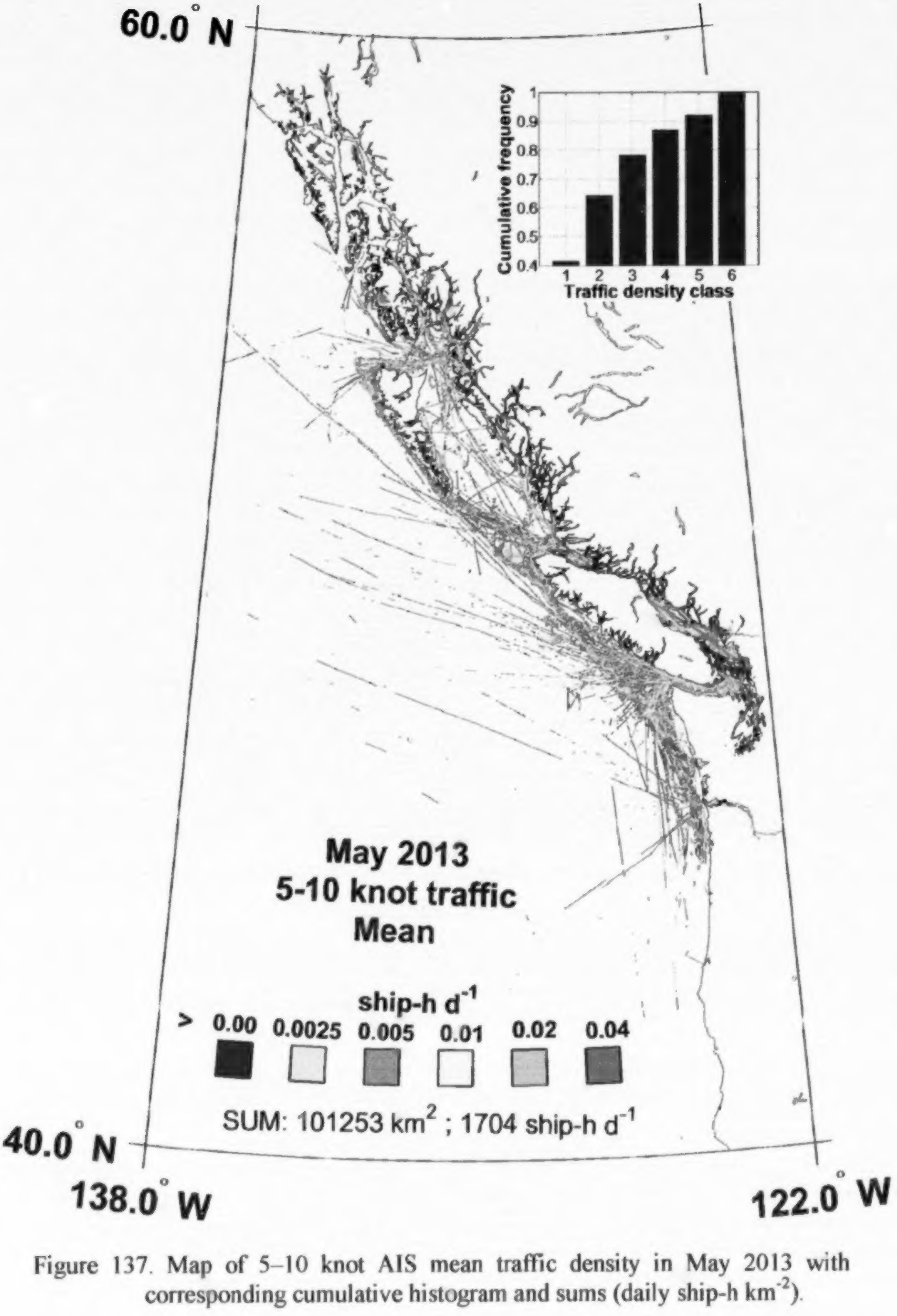

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 101253 km^2 ; 1704 ship-h d^{-1}

Figure 137. Map of 5–10 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

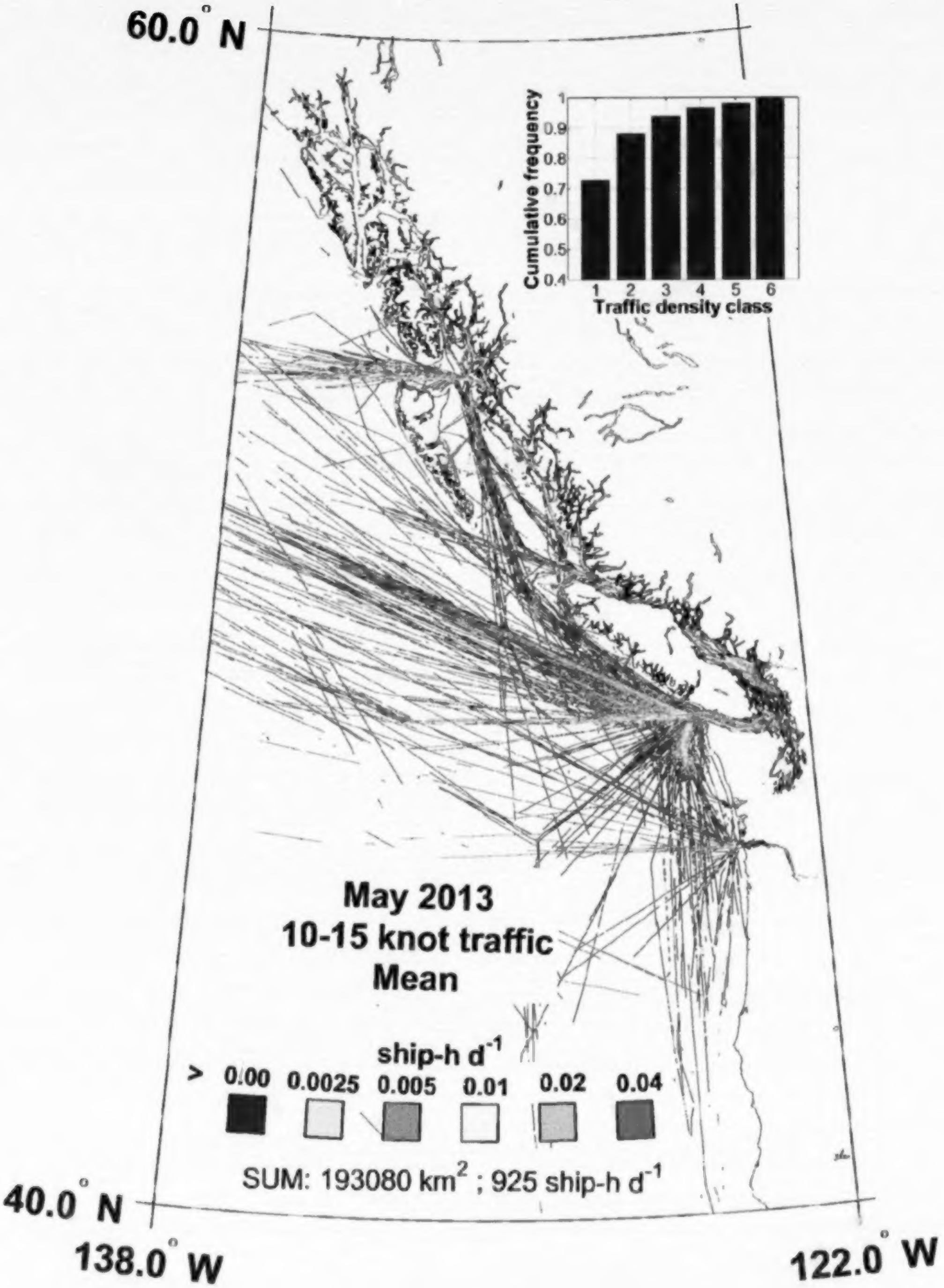

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 193080 km^2 ; 925 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 138. Map of 10–15 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

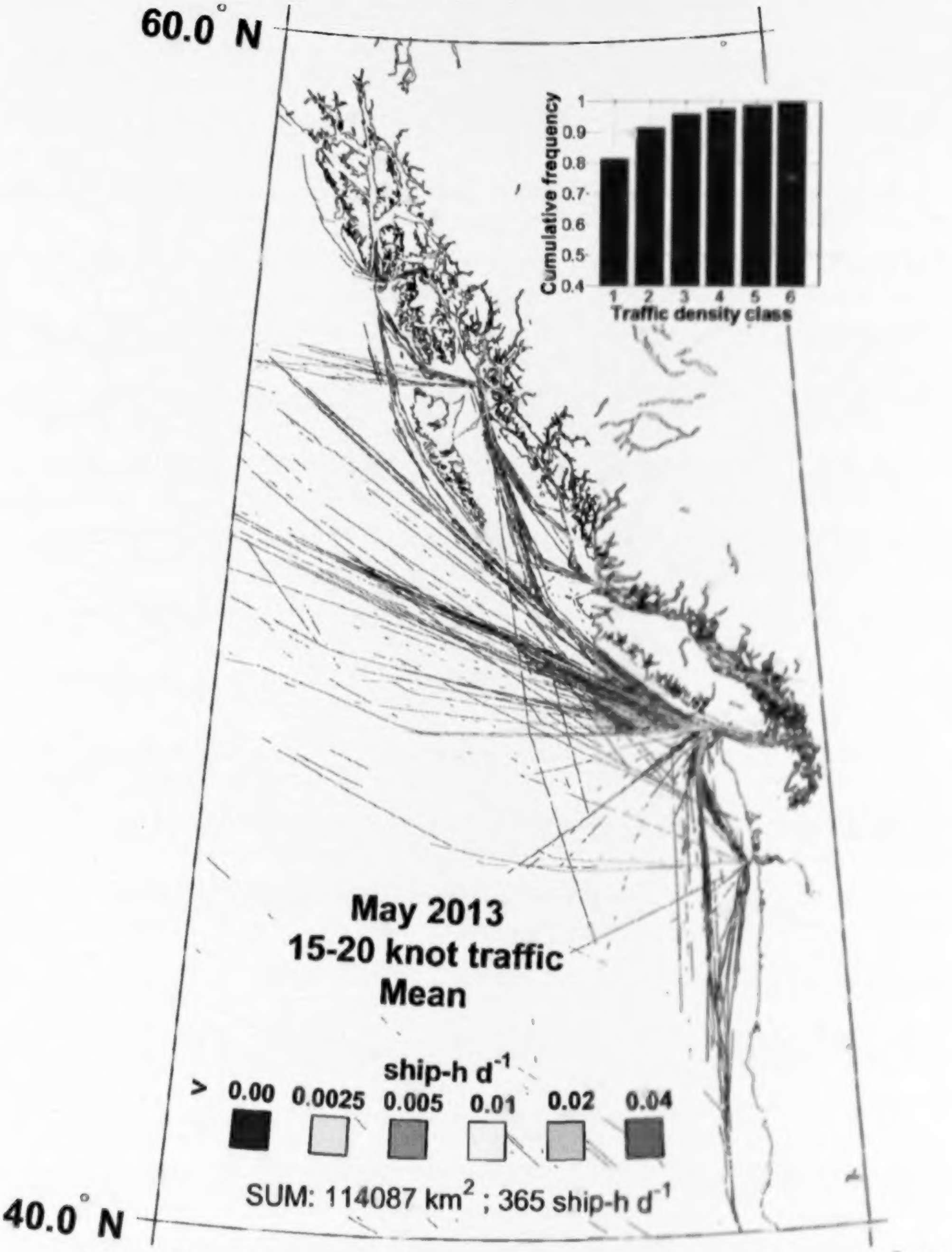

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
May 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 114087 km^2 ; 365 ship-h d^{-1}

Figure 139. Map of 15–20 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

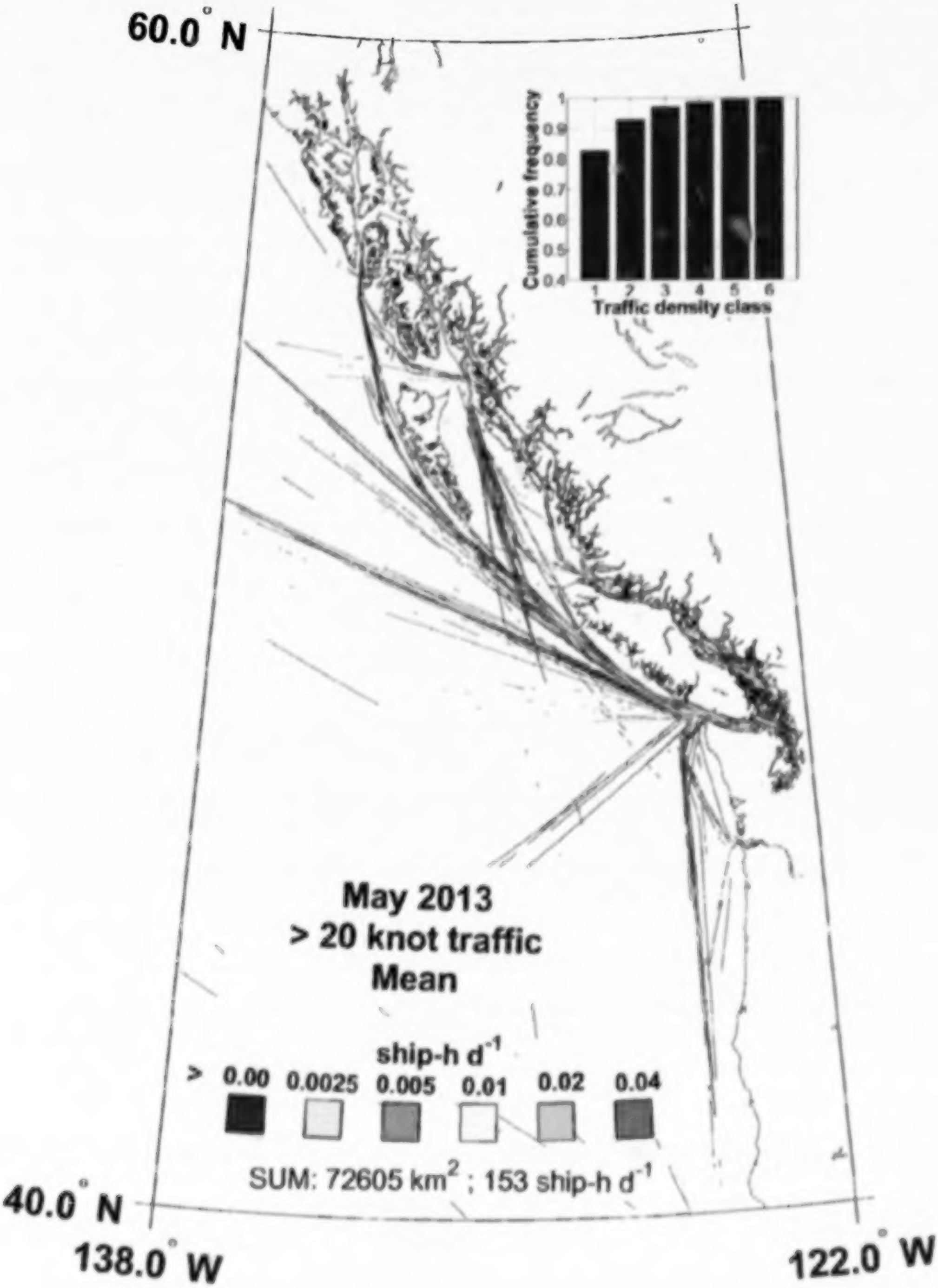

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
May 2013
> 20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 72605 km^2 ; 153 ship-h d^{-1}

Figure 140. Map of >20 knot AIS mean traffic density in May 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.6. June 2013

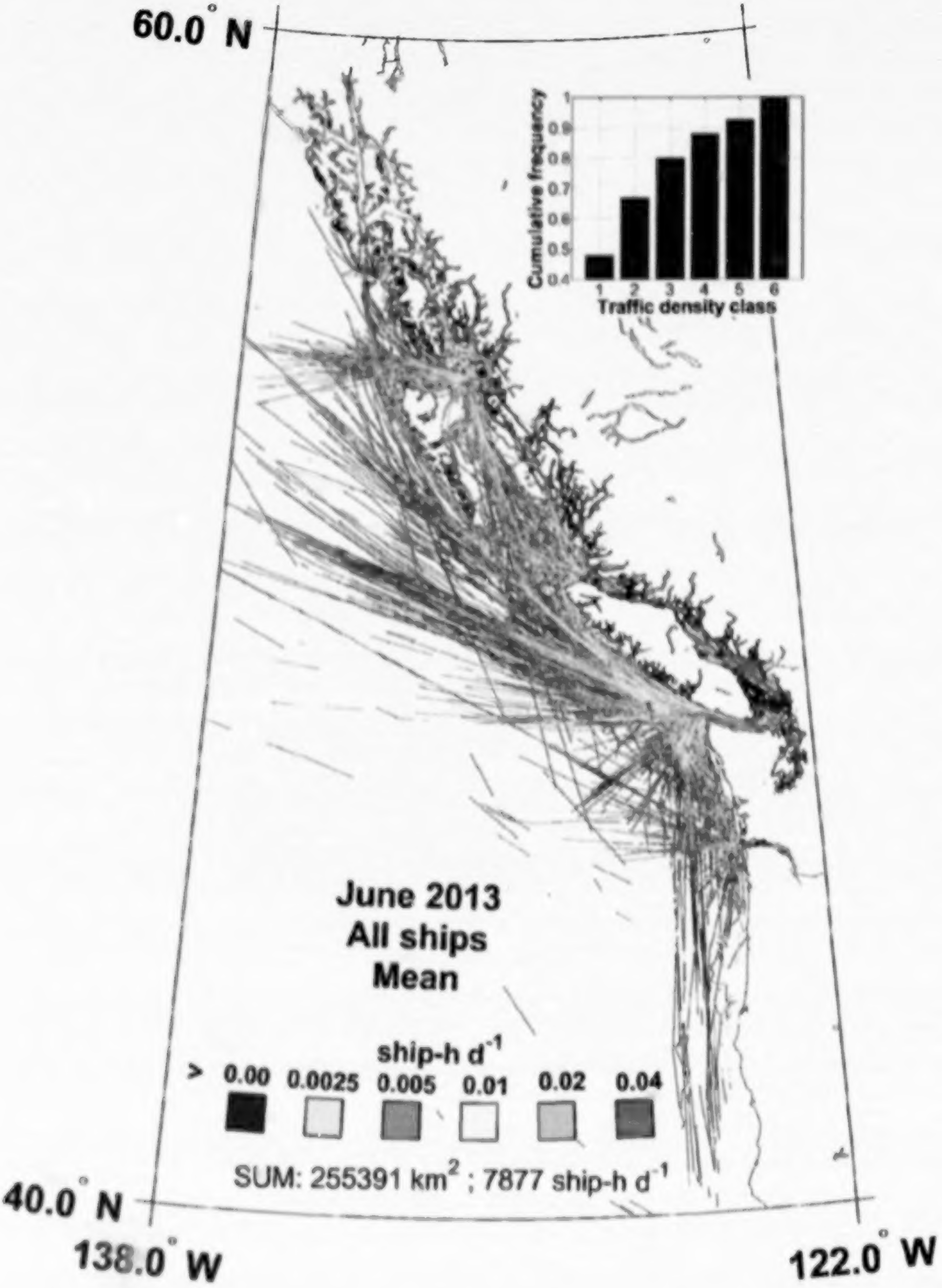

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
June 2013
All ships
Mean
ship-h d^-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 255391 km² ; 7877 ship-h d^-1

Figure 141. Map of AIS mean traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

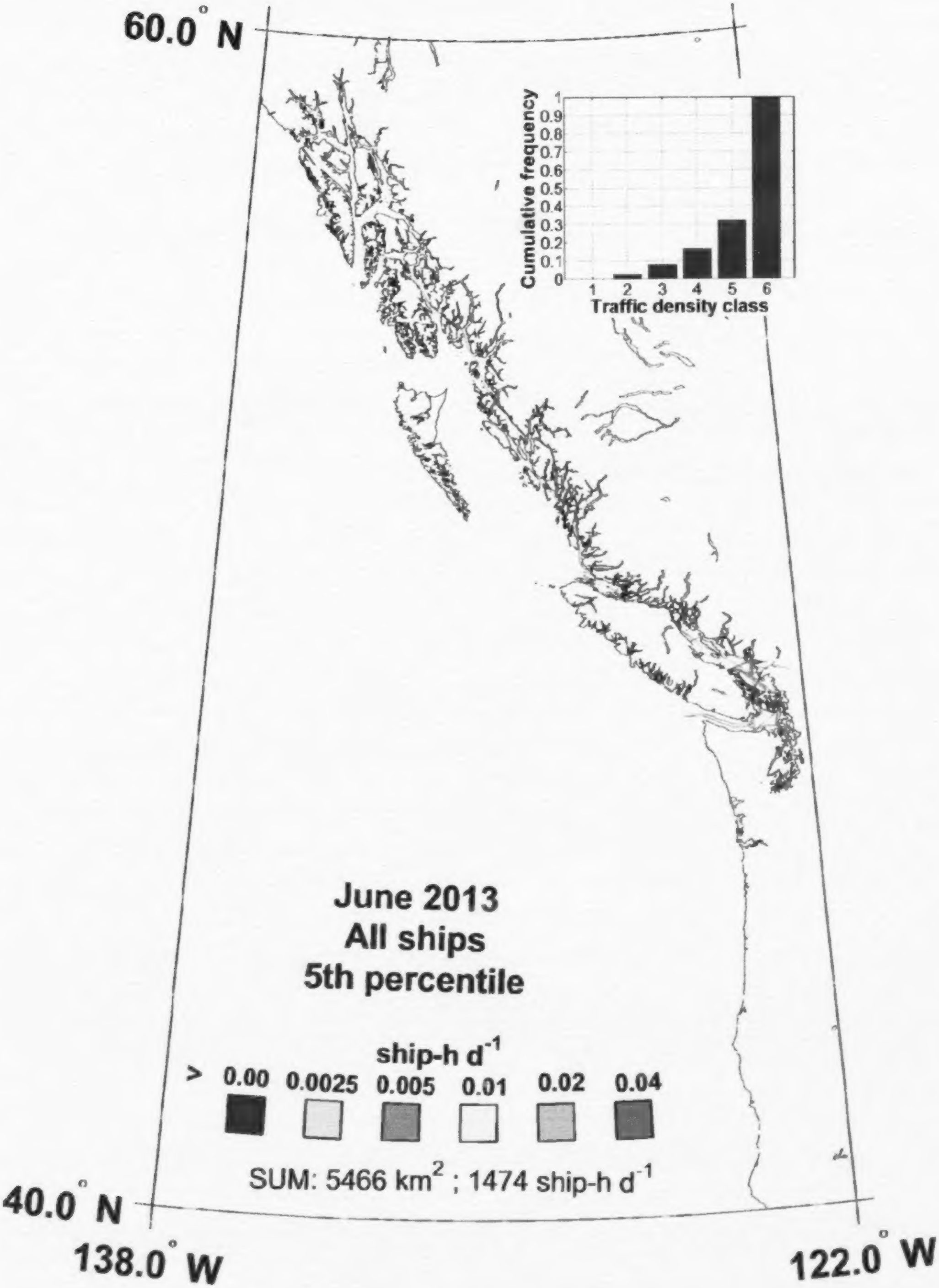

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
June 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 5466 km^2 ; 1474 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 142. Map of the 5th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

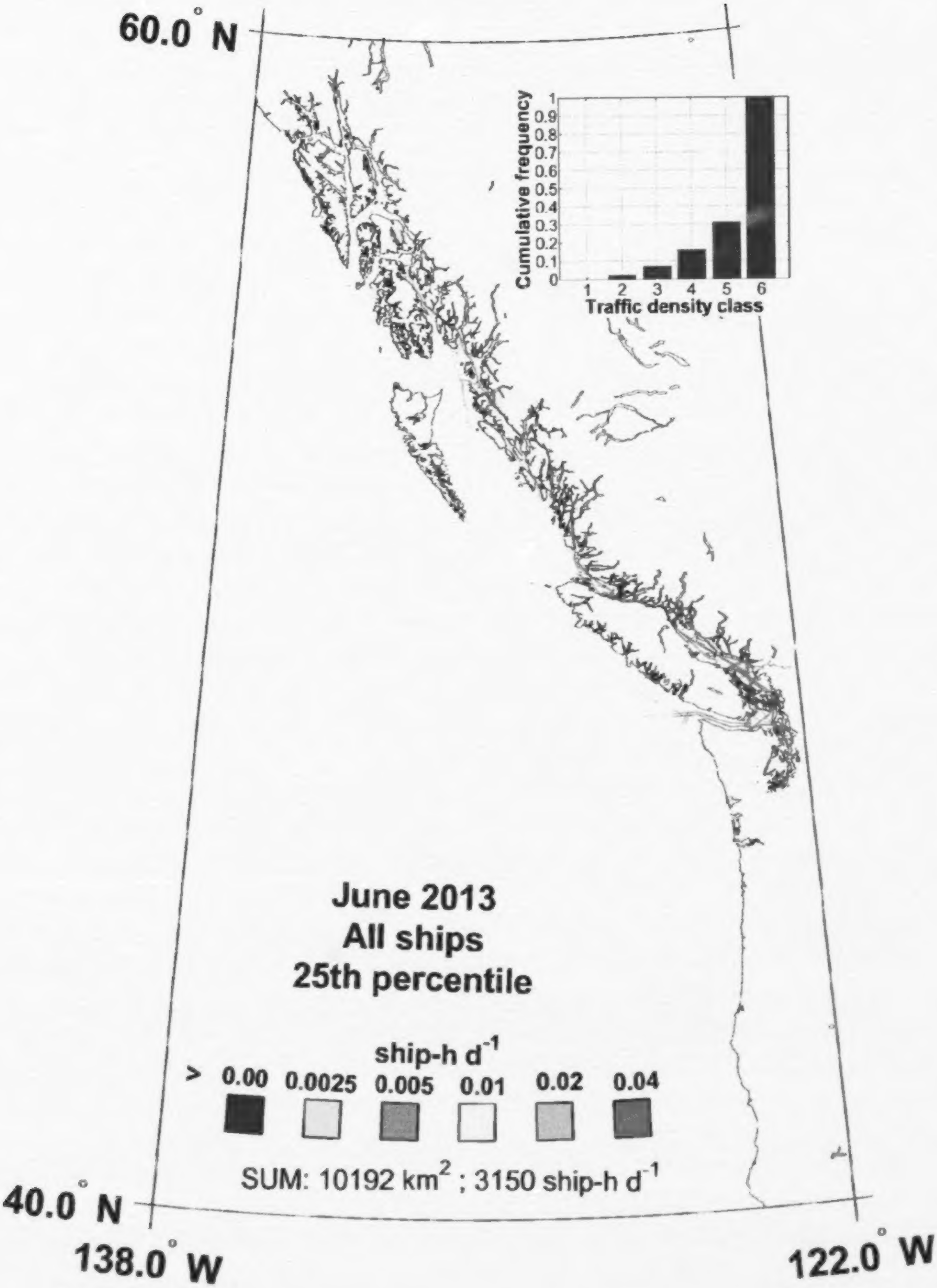

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
June 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 10192 km^2 ; 3150 ship-h d^{-1}

Figure 143. Map of the 25th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

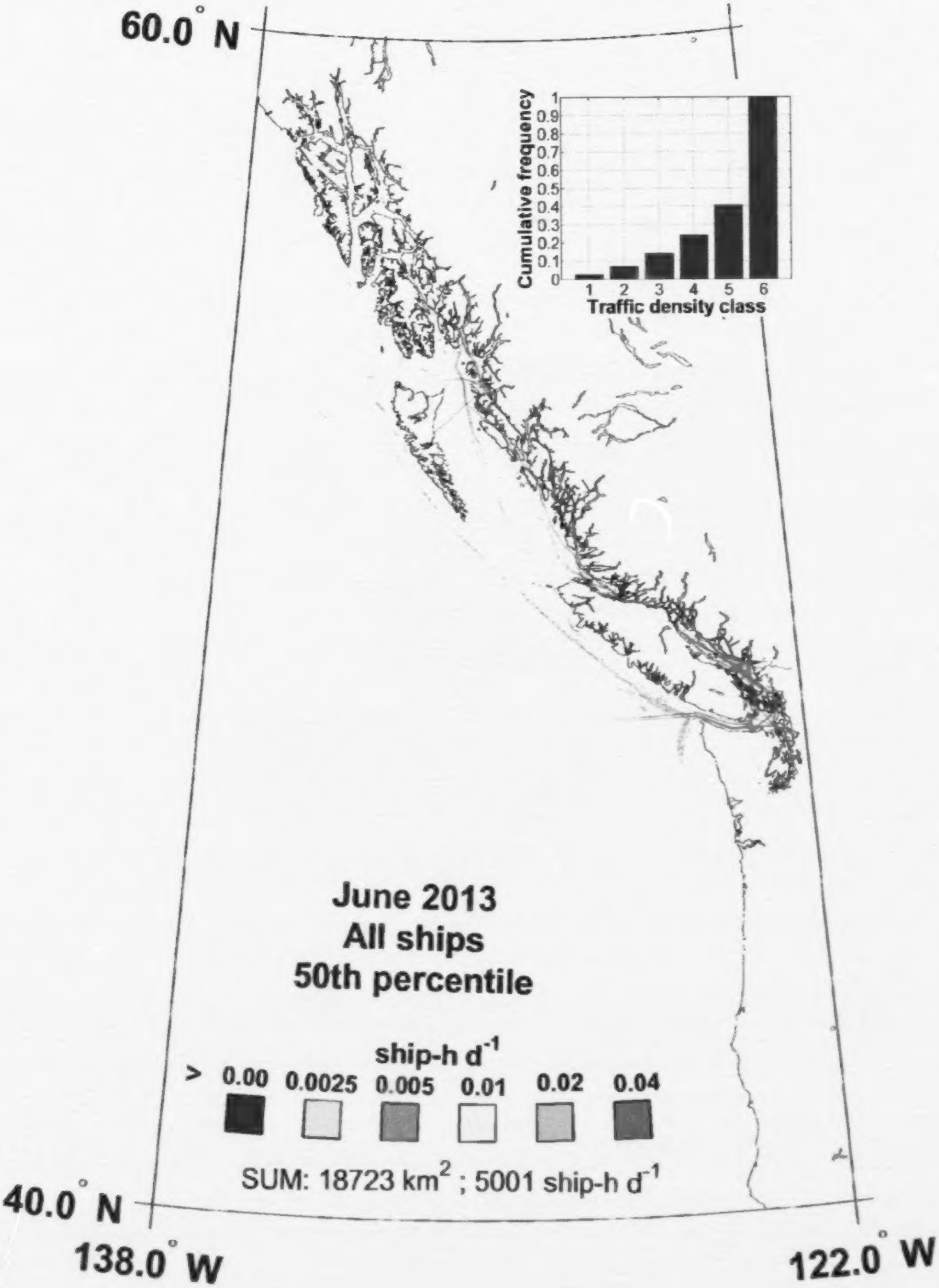

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
June 2013
All ships
50th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 18723 km2 ; 5001 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 144. Map of the 50th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

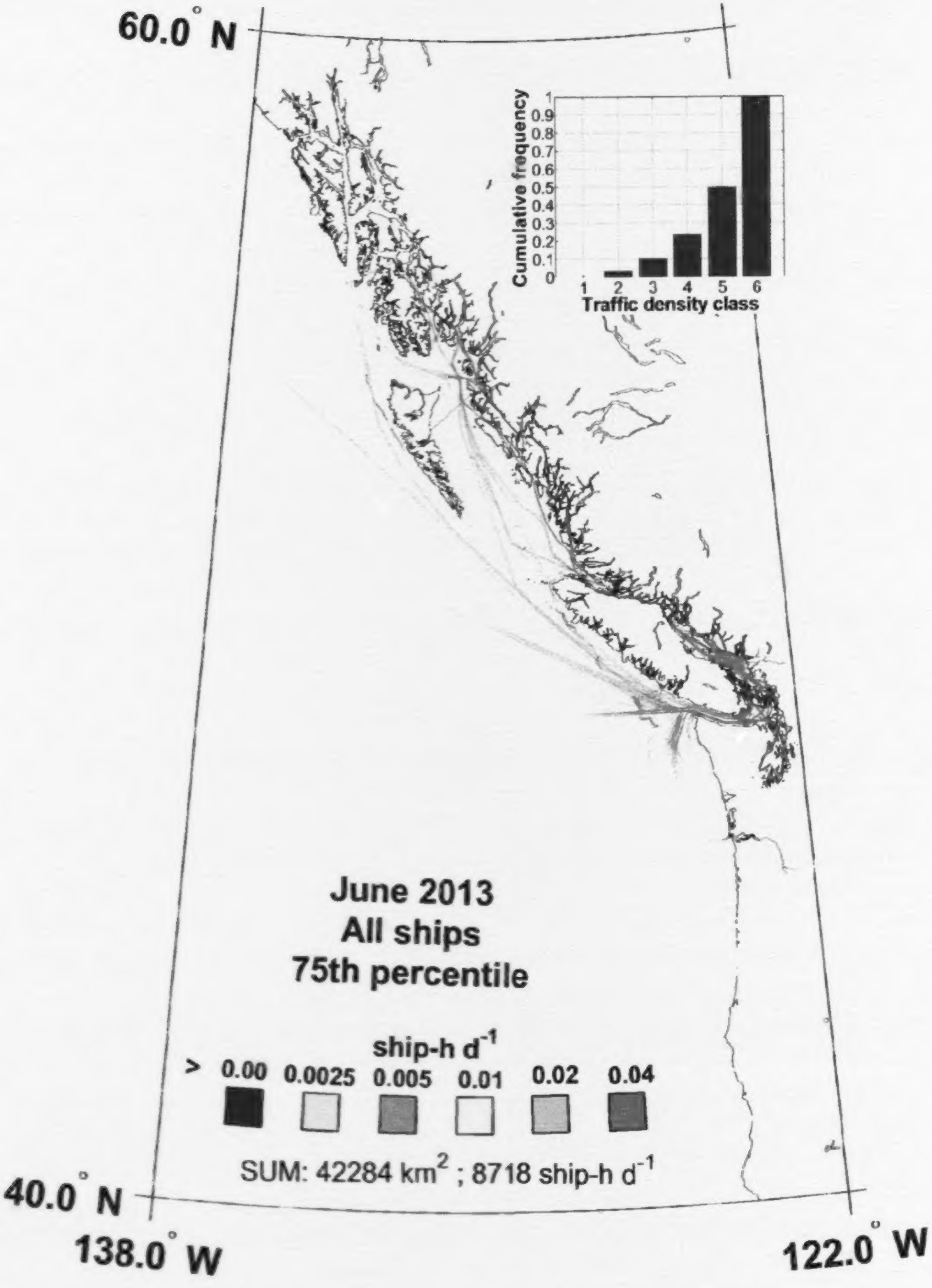

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
June 2013
All ships
75th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 42284 km^2 ; 8718 ship-h d^{-1}

Figure 145. Map of the 75th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

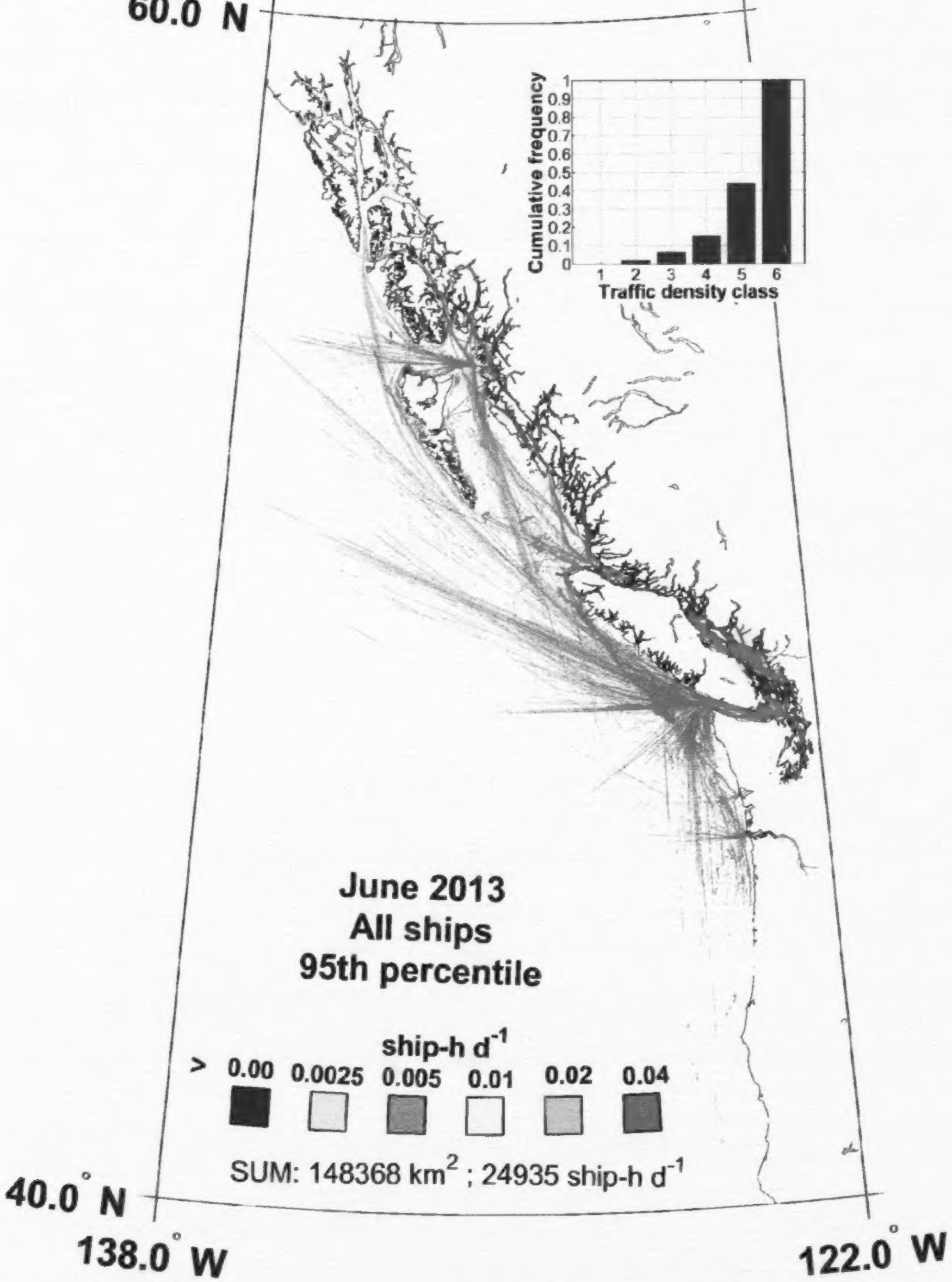

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
June 2013
All ships
95th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 148368 km² ; 24935 ship-h d⁻¹

Figure 146. Map of the 95th percentile of the daily AIS traffic density of all ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

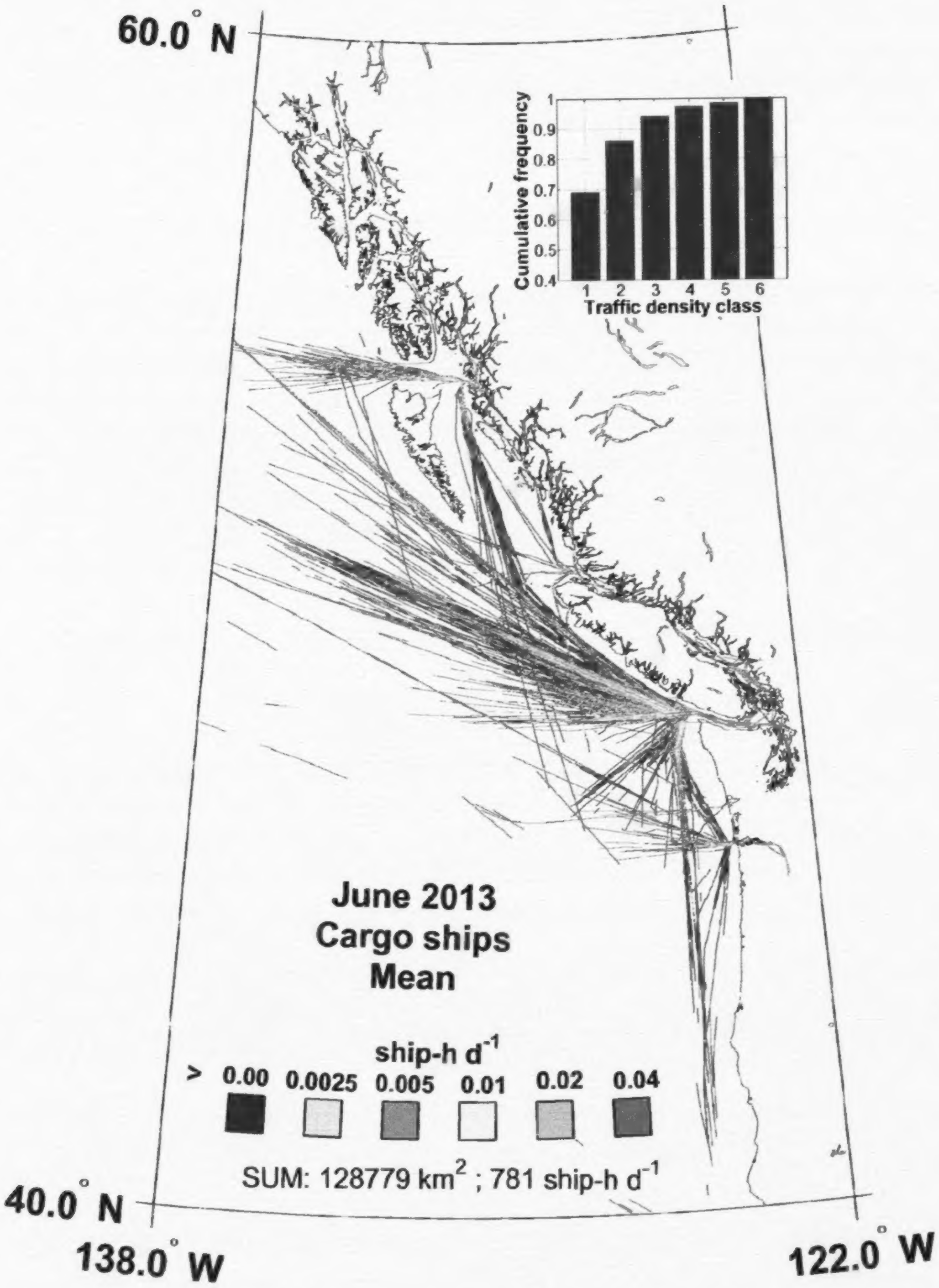

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 128779 km^2 ; 781 ship-h d^{-1}

Figure 147. Map of AIS mean traffic density of cargo-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

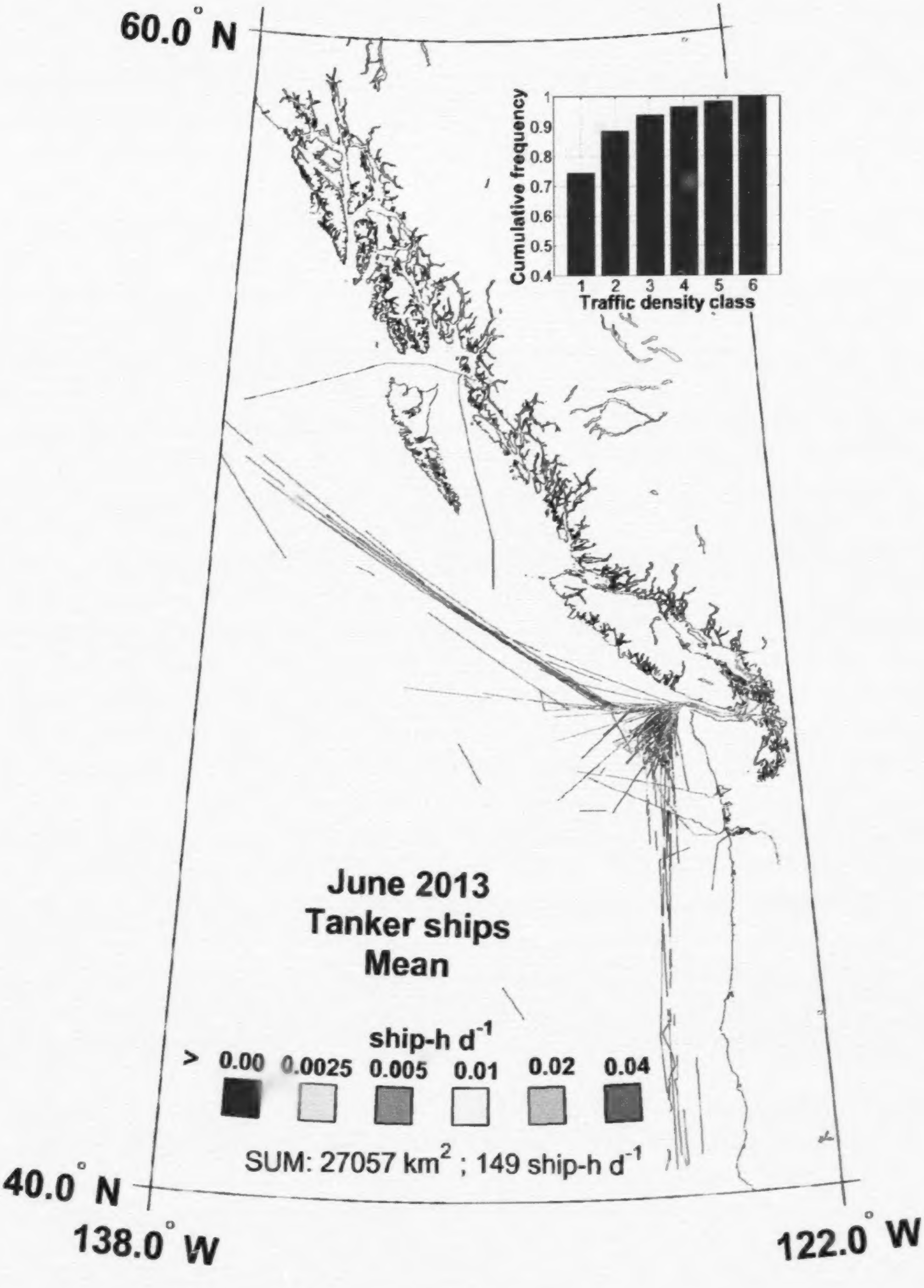

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 27057 km^2 ; 149 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 148. Map of AIS mean traffic density of tanker-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

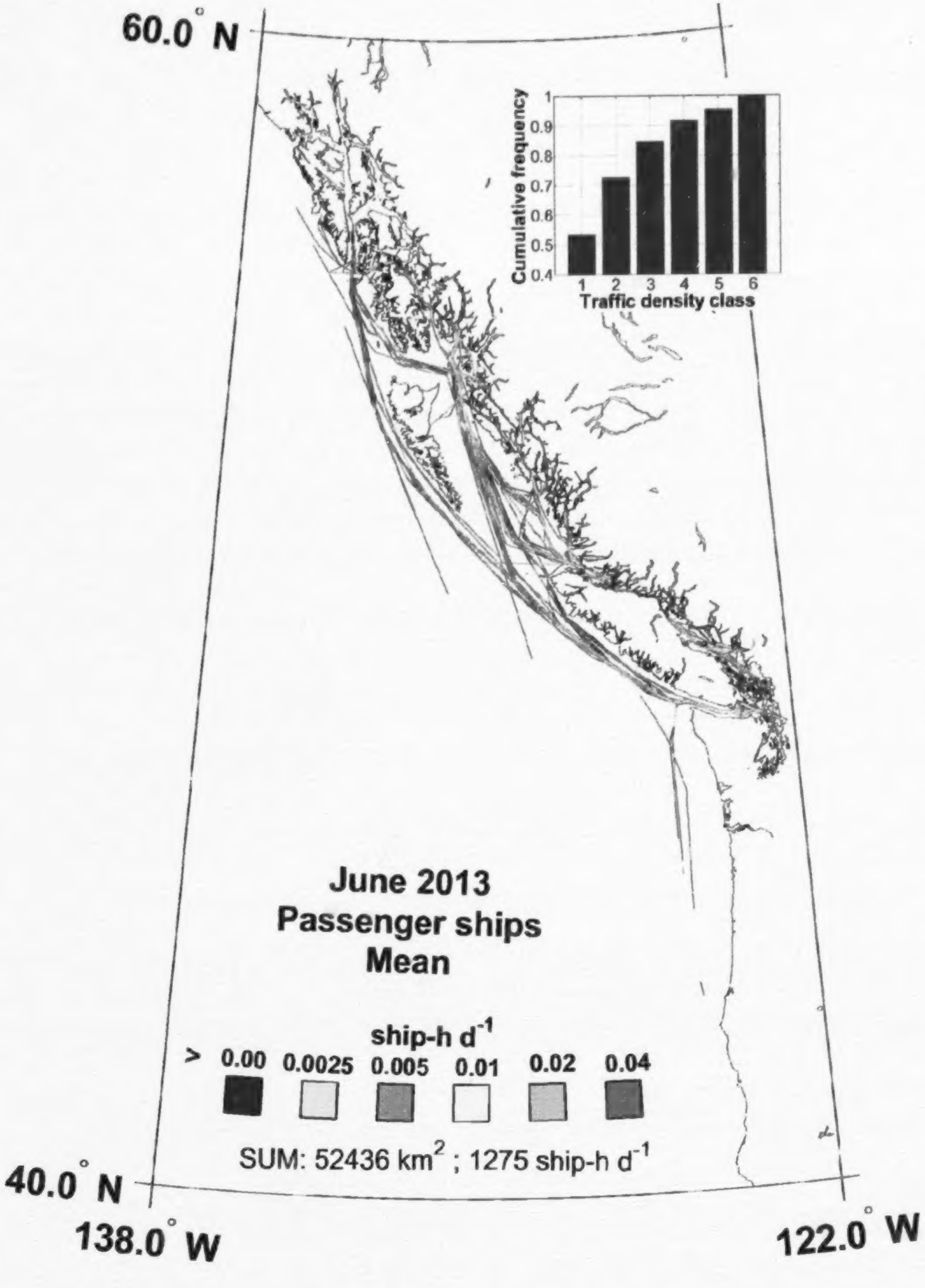

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
June 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 52436 km^2 ; 1275 ship-h d^{-1}

Figure 149. Map of AIS mean traffic density of passenger-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

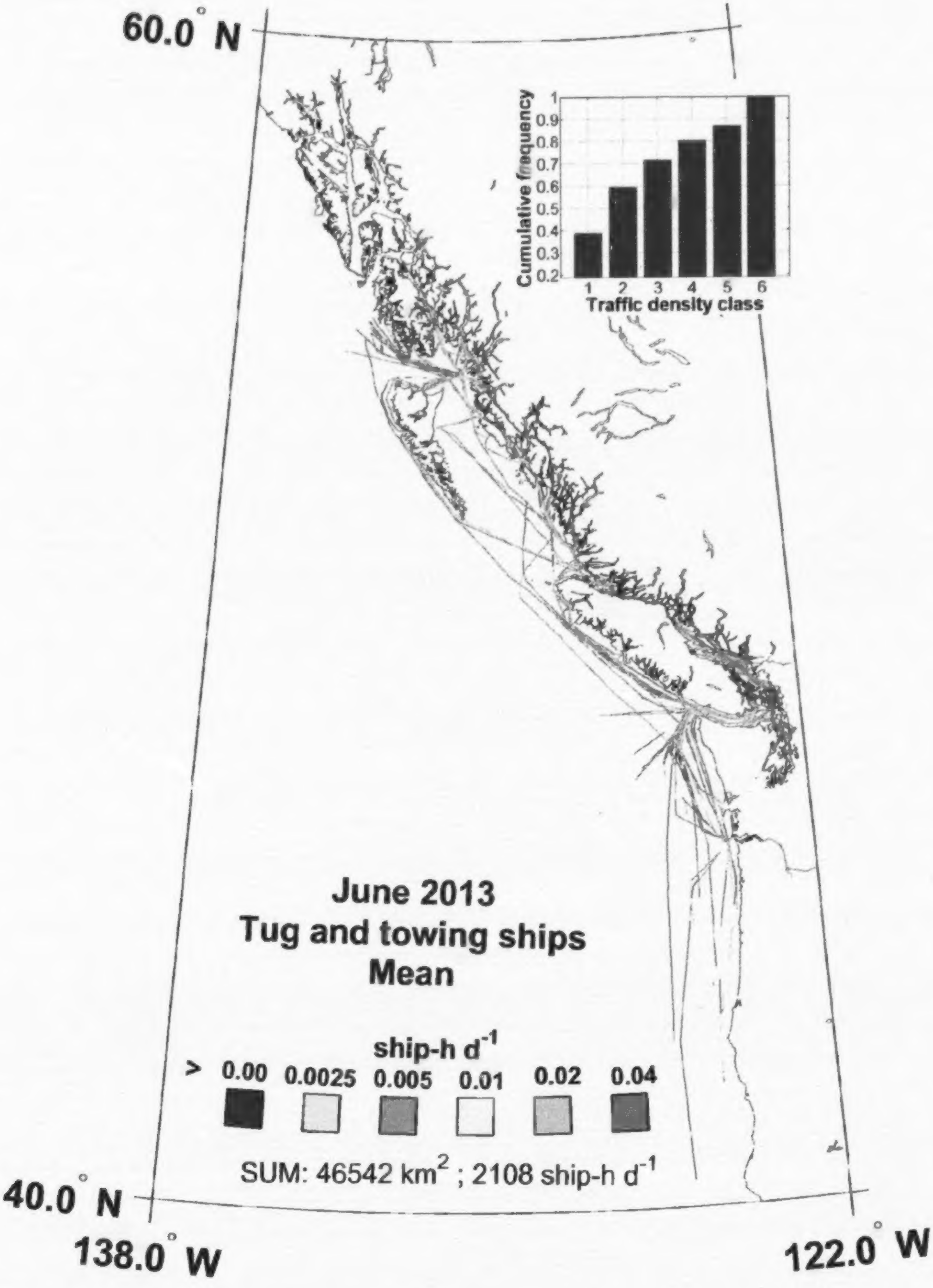

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
June 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 46542 km^2 ; 2108 ship-h d^{-1}

Figure 150. Map of AIS mean traffic density of tug and towing -type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

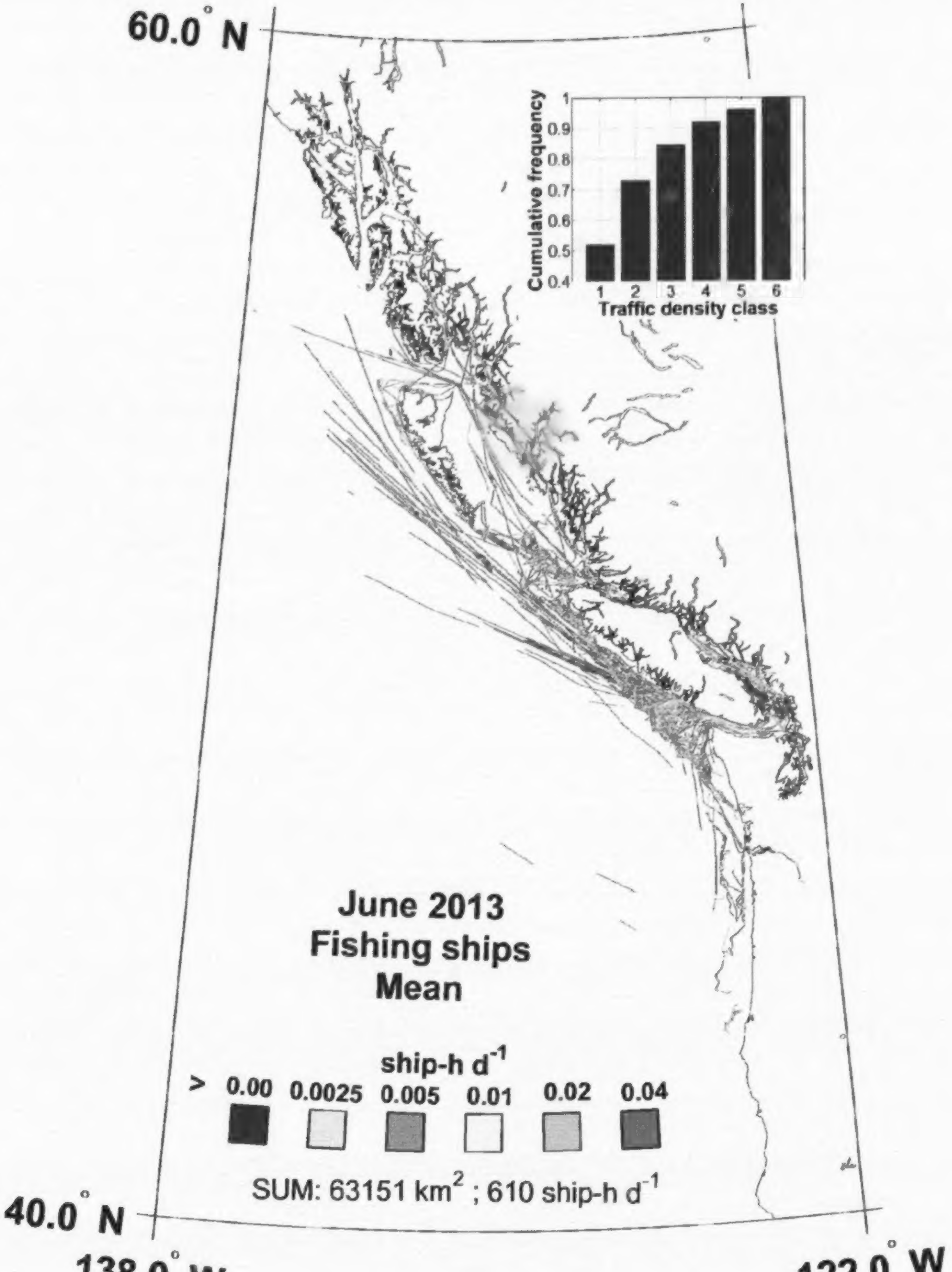

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
Fishing ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 63151 km² ; 610 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 151. Map of AIS mean traffic density of fishing-type ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

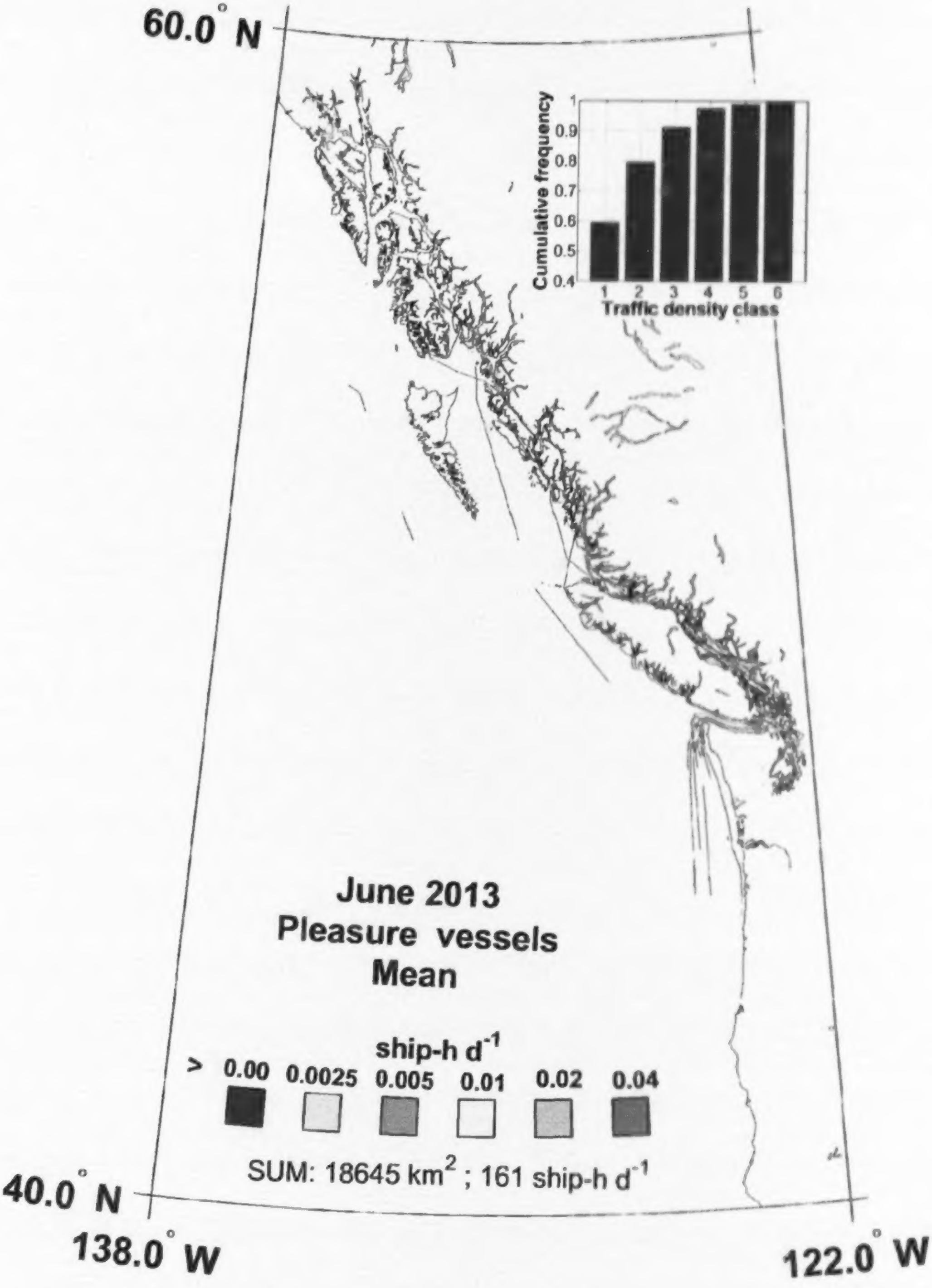

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
Pleasure vessels
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 18645 km2 ; 161 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 152. Map of AIS mean traffic density of pleasure-type vessels in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

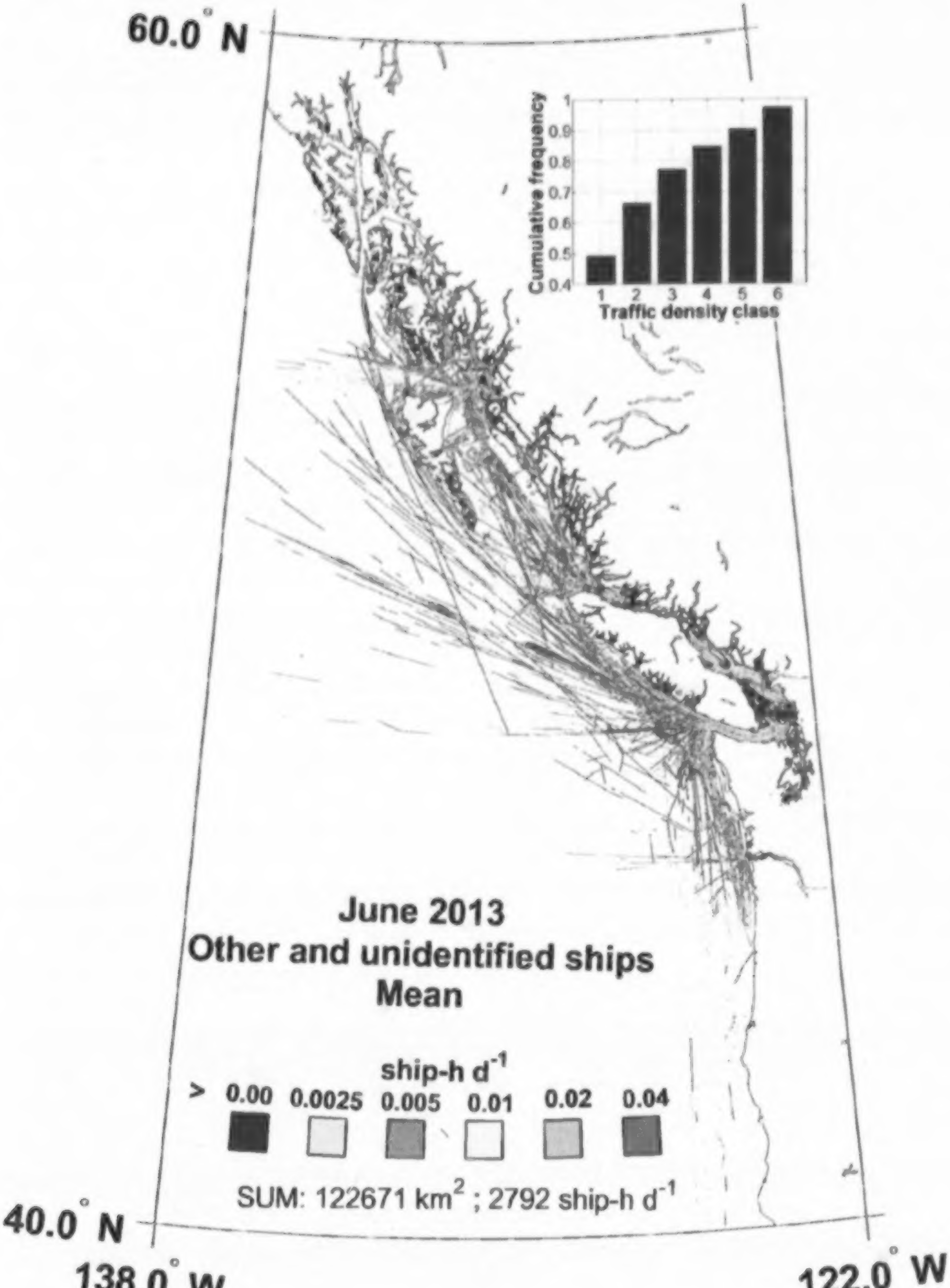

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
June 2013
Other and unidentified ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 122671 km2 ; 2792 ship-h d-1

Figure 153. Map of AIS mean traffic density of other type of ships and ships of unidentified type in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

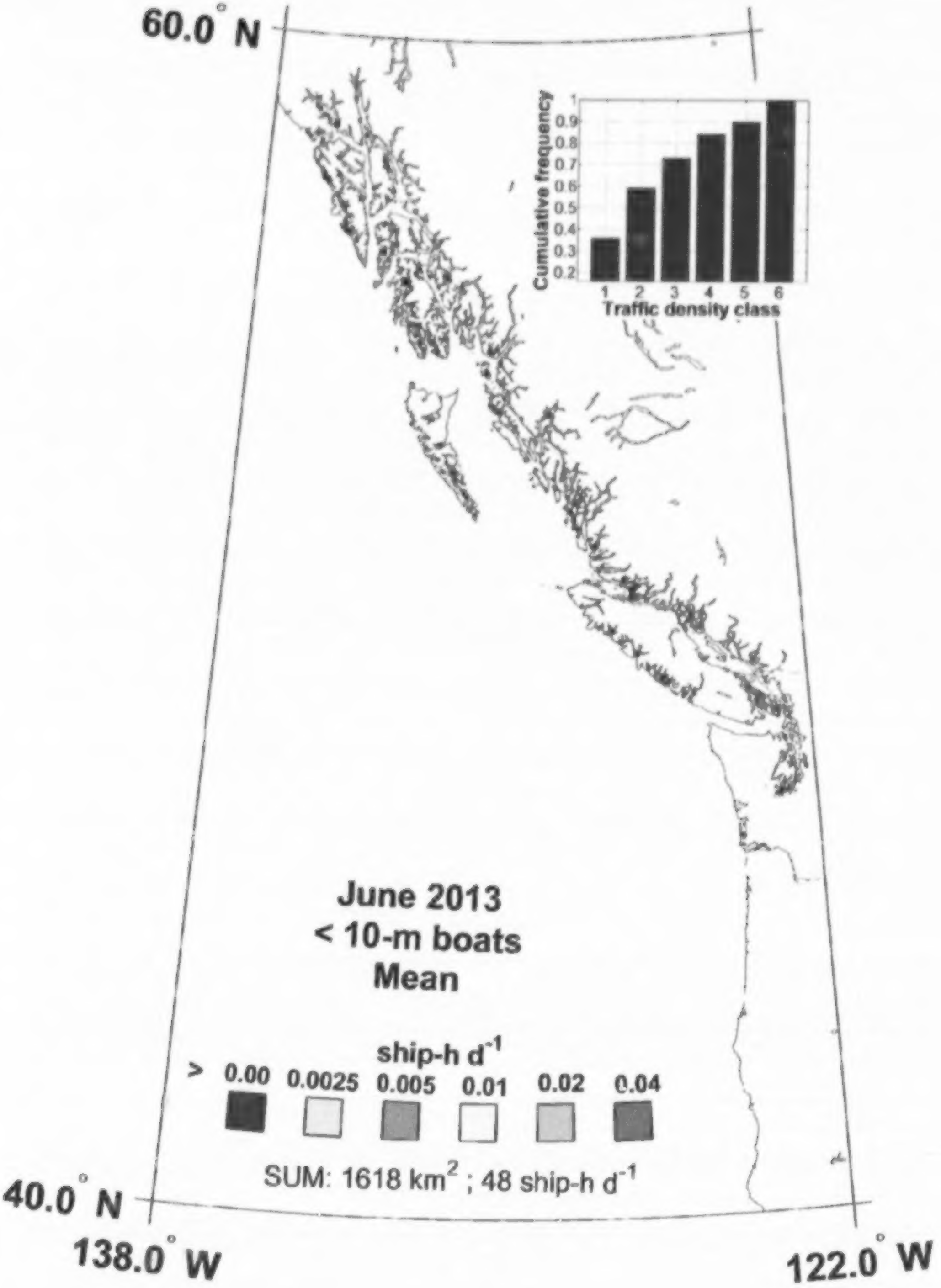

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
June 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 1618 km^2 ; 48 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 154. Map of AIS mean traffic density of ships with lengths < 10 min June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

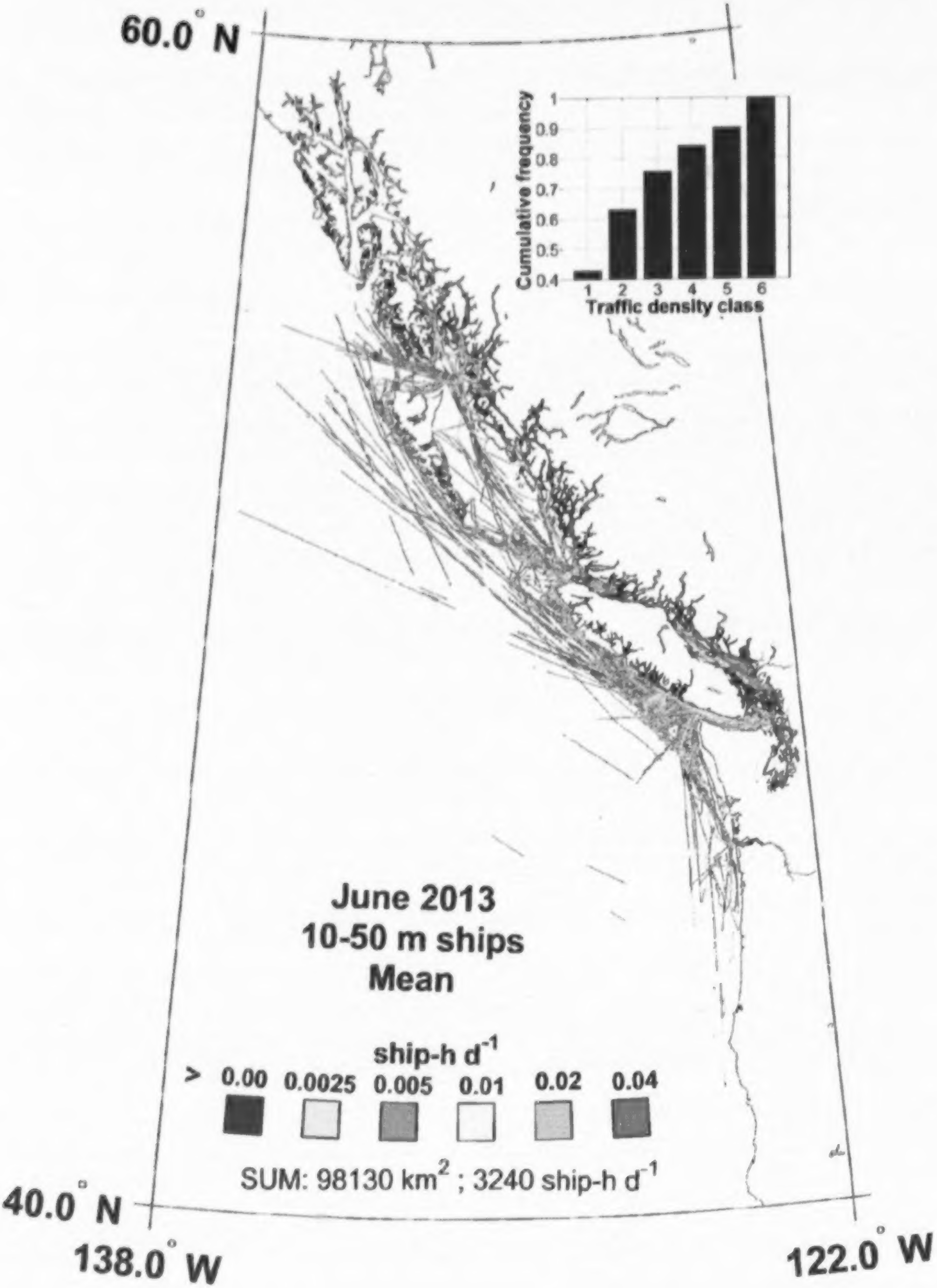

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
10-50 m ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 98130 km2 ; 3240 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 155. Map of AIS mean traffic density of 10 to 50 m ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

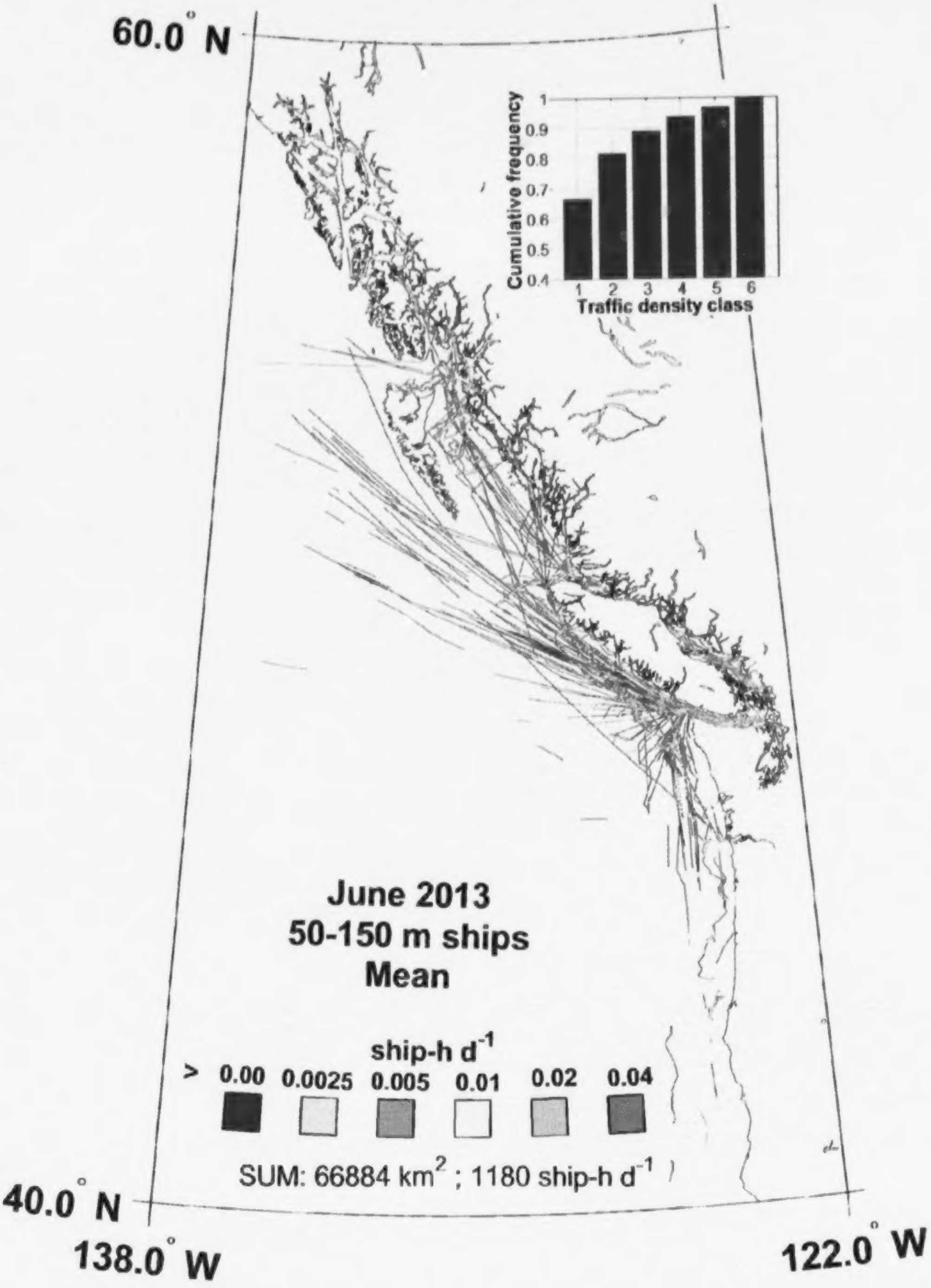

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
June 2013
50-150 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 66884 km^2 ; 1180 ship-h d^{-1}

Figure 156. Map of AIS mean traffic density of 50 to 150 m ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

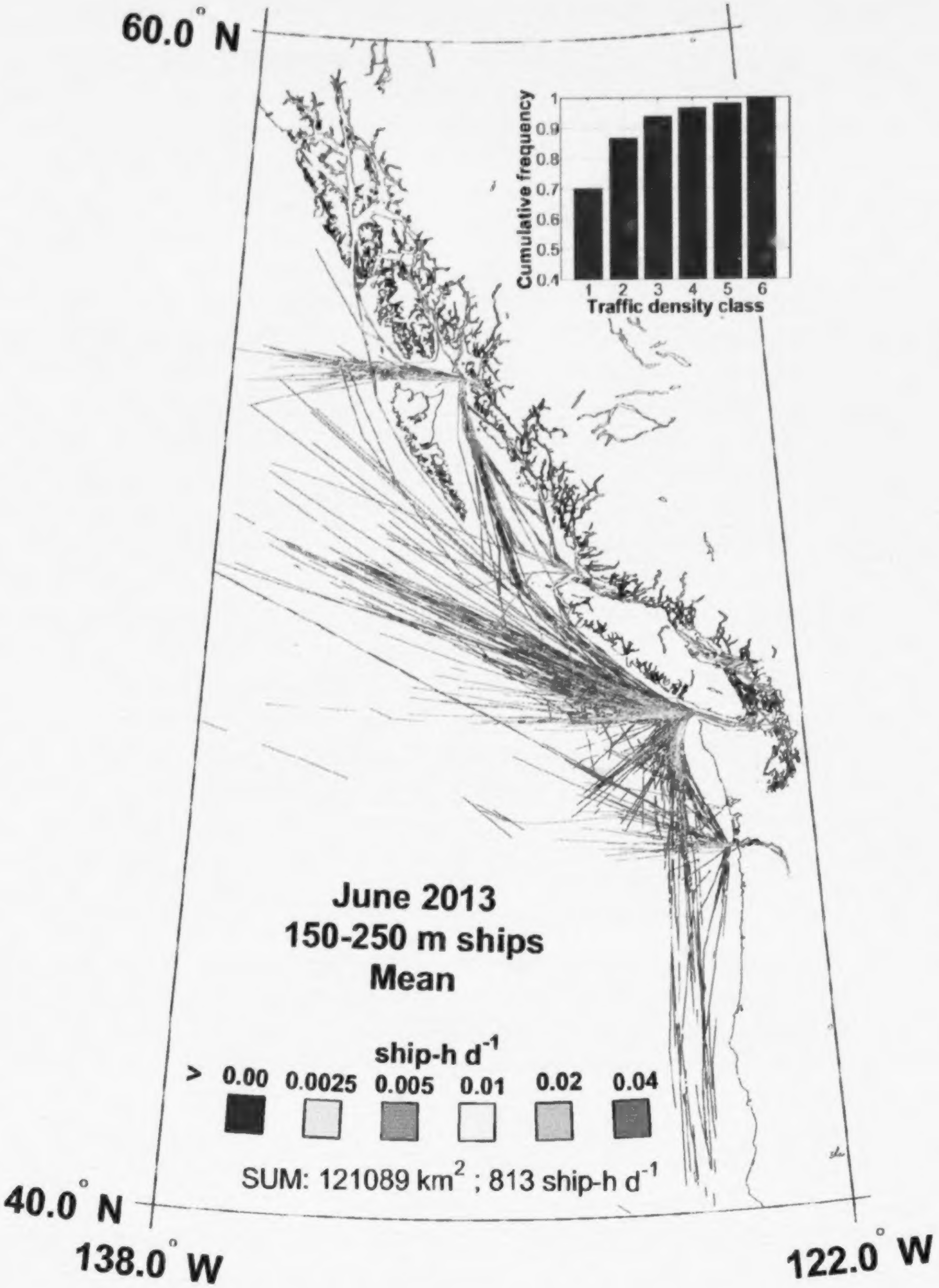

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
150-250 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 121089 km² ; 813 ship-h d⁻¹

Figure 157. Map of AIS mean traffic density of 150 to 250 m ships in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

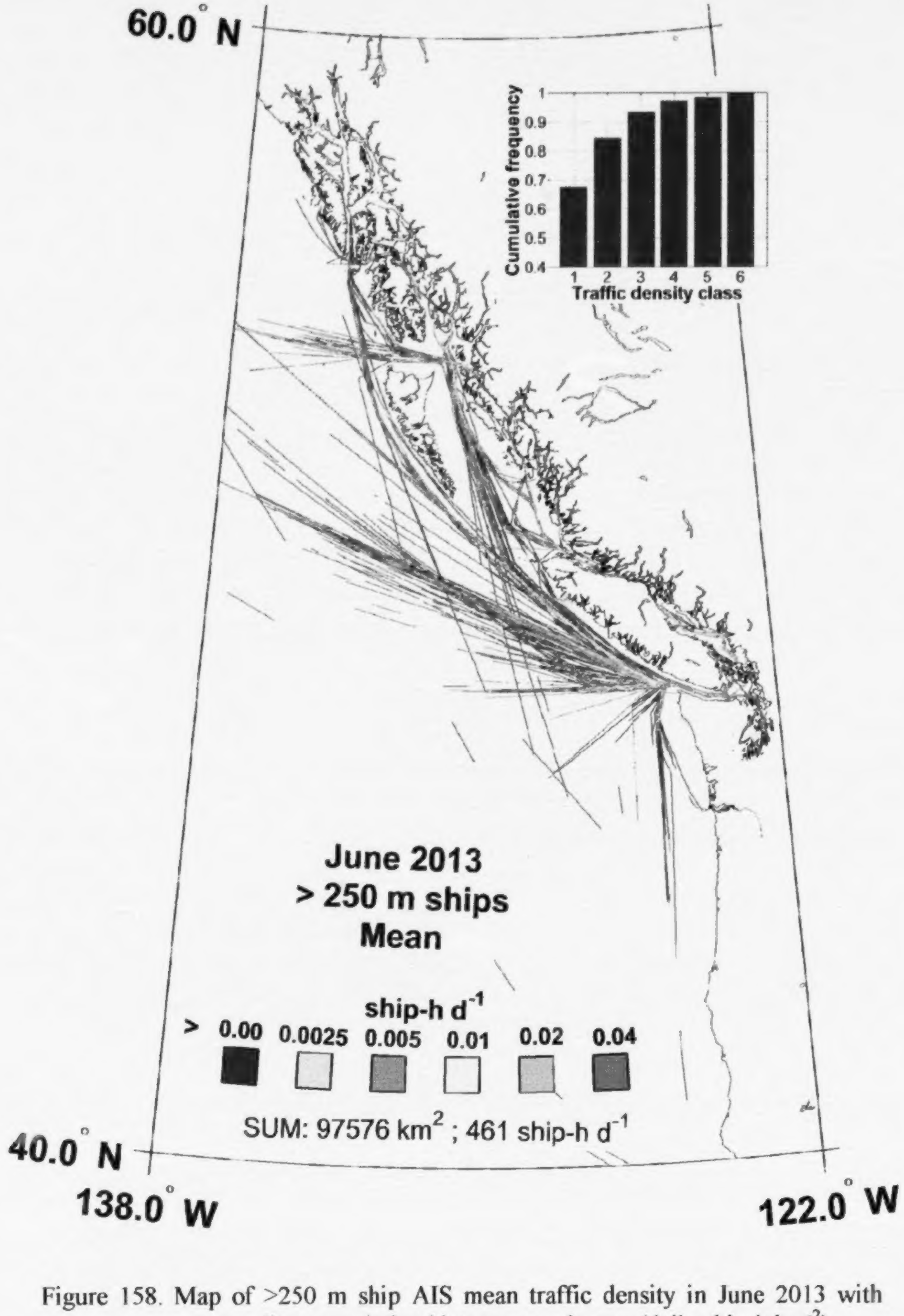

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 97576 km^2 ; 461 ship-h d^{-1}

Figure 158. Map of >250 m ship AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

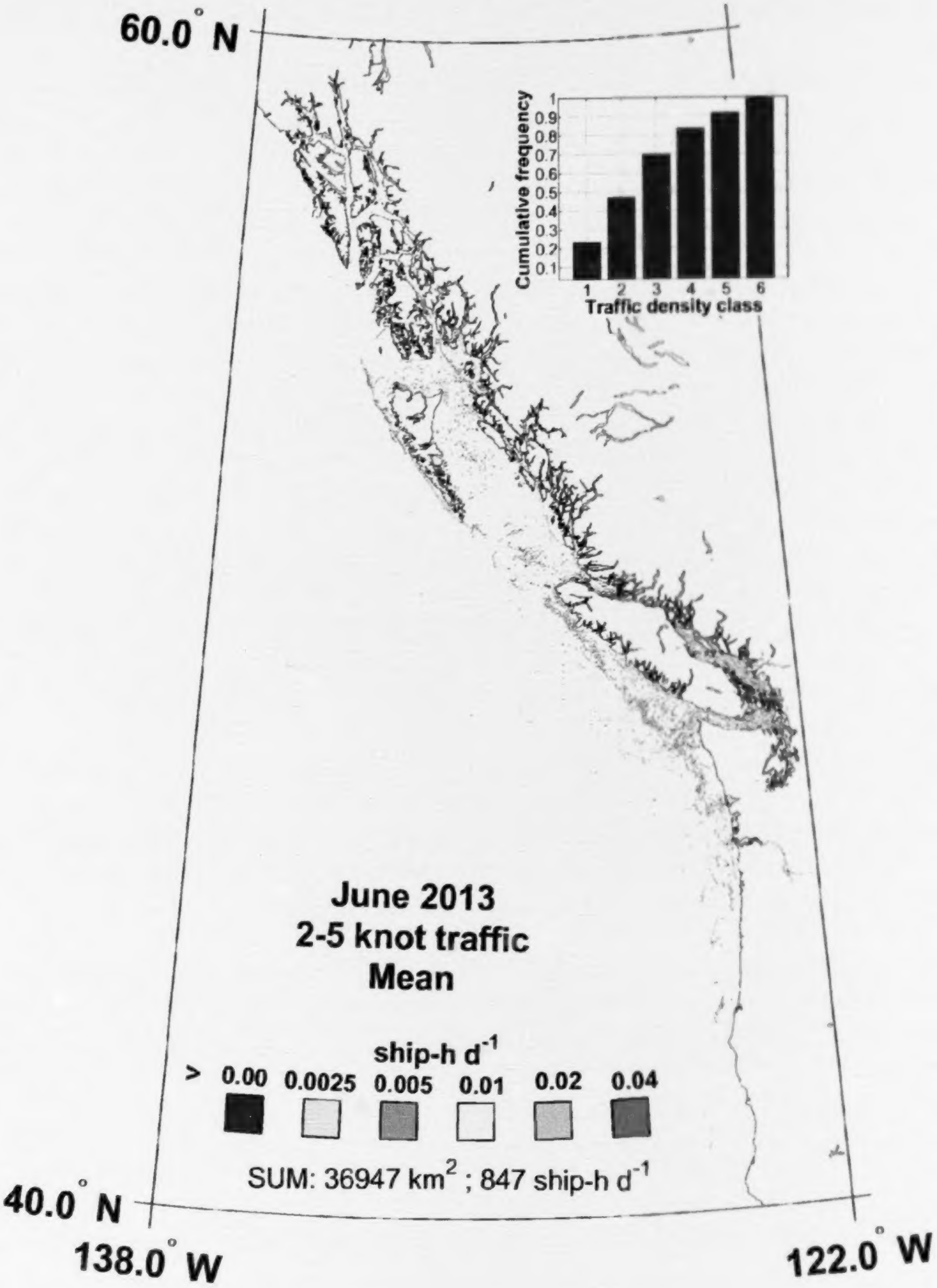

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
June 2013
2-5 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 36947 km^2 ; 847 ship-h d^{-1}

Figure 159. Map of 2–5 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

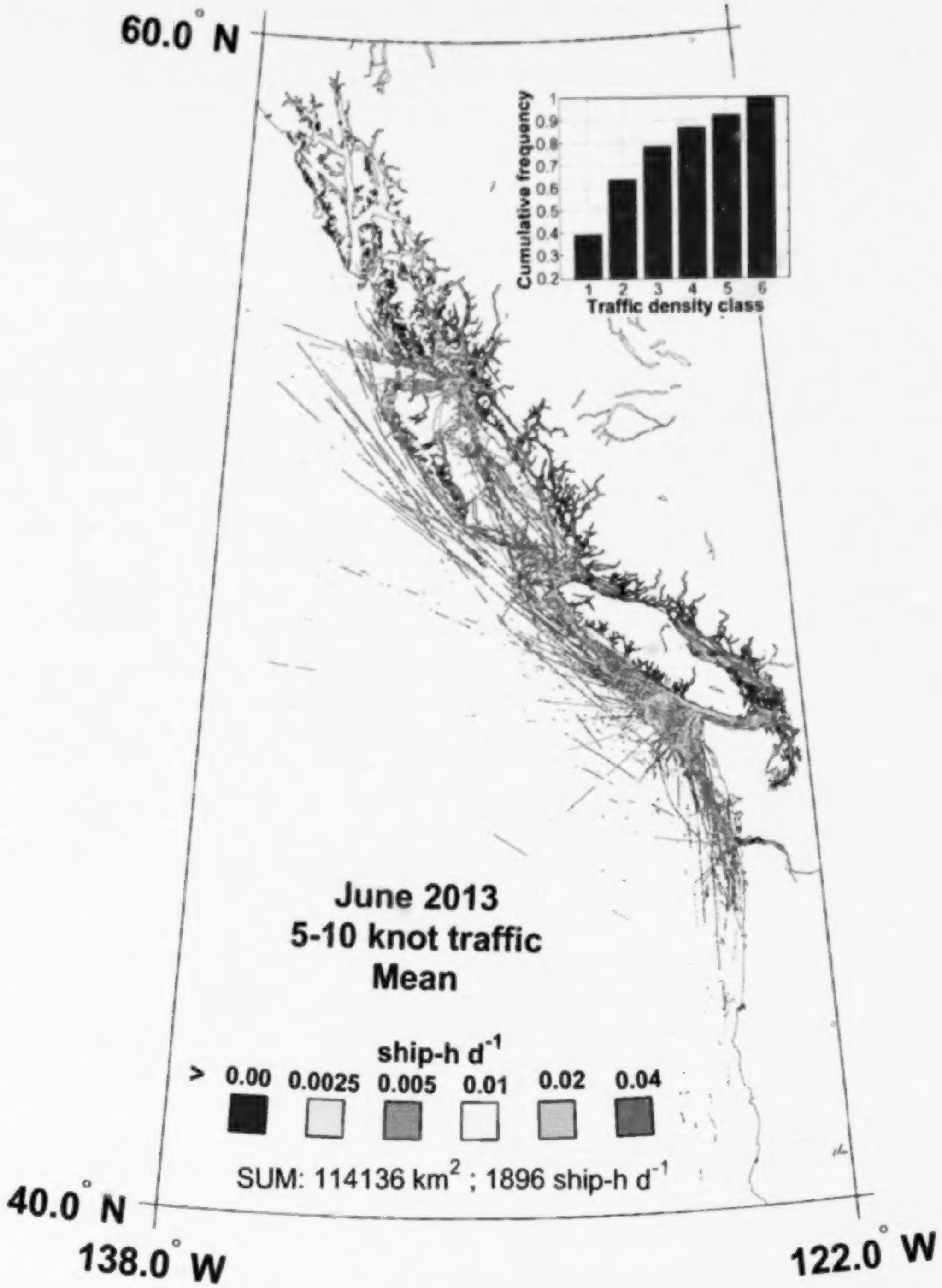

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
June 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 114136 km^2 ; 1896 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 160. Map of 5–10 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

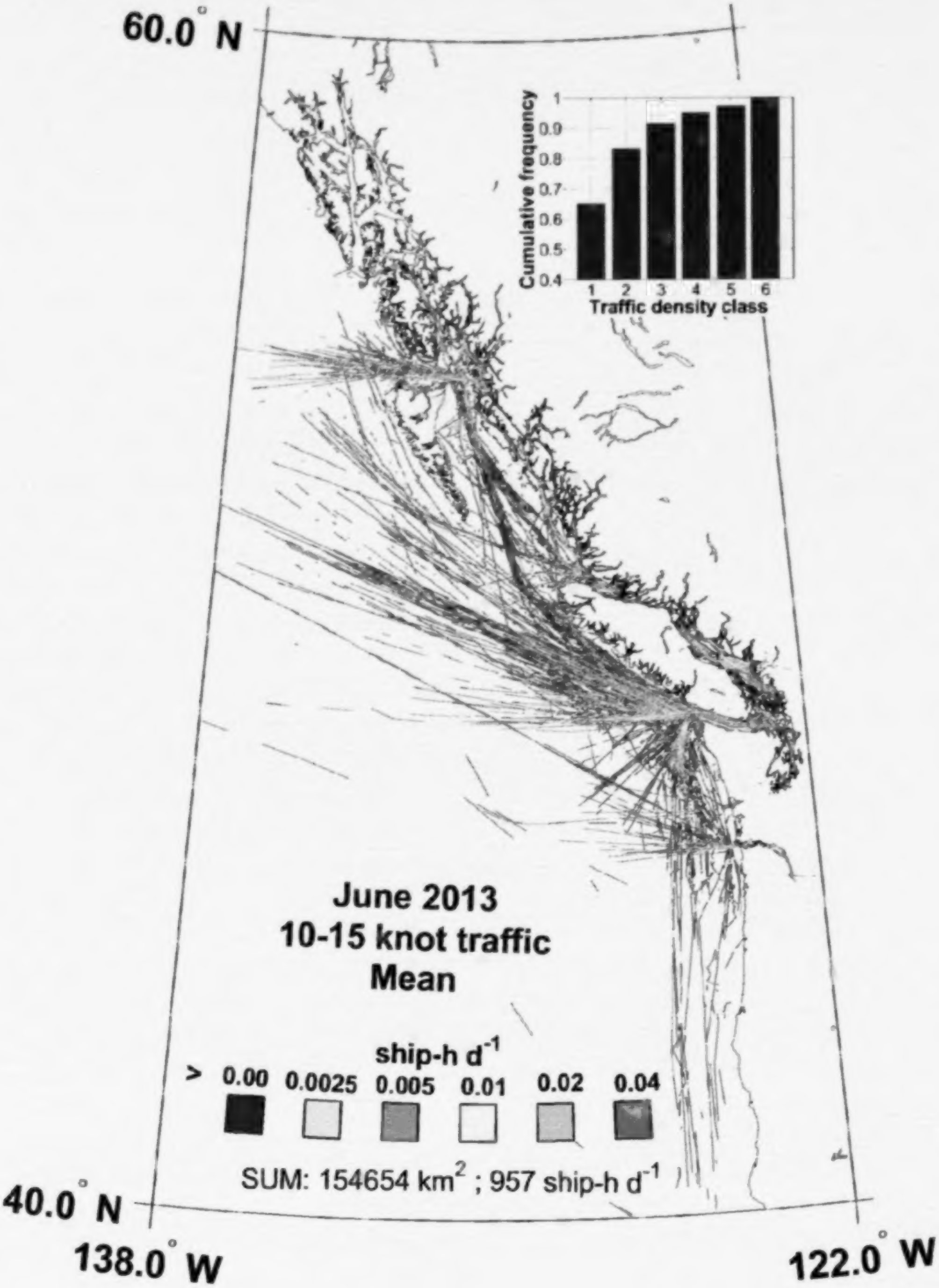

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
10-15 knot traffic
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 154654 km² ; 957 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 161. Map of 10–15 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

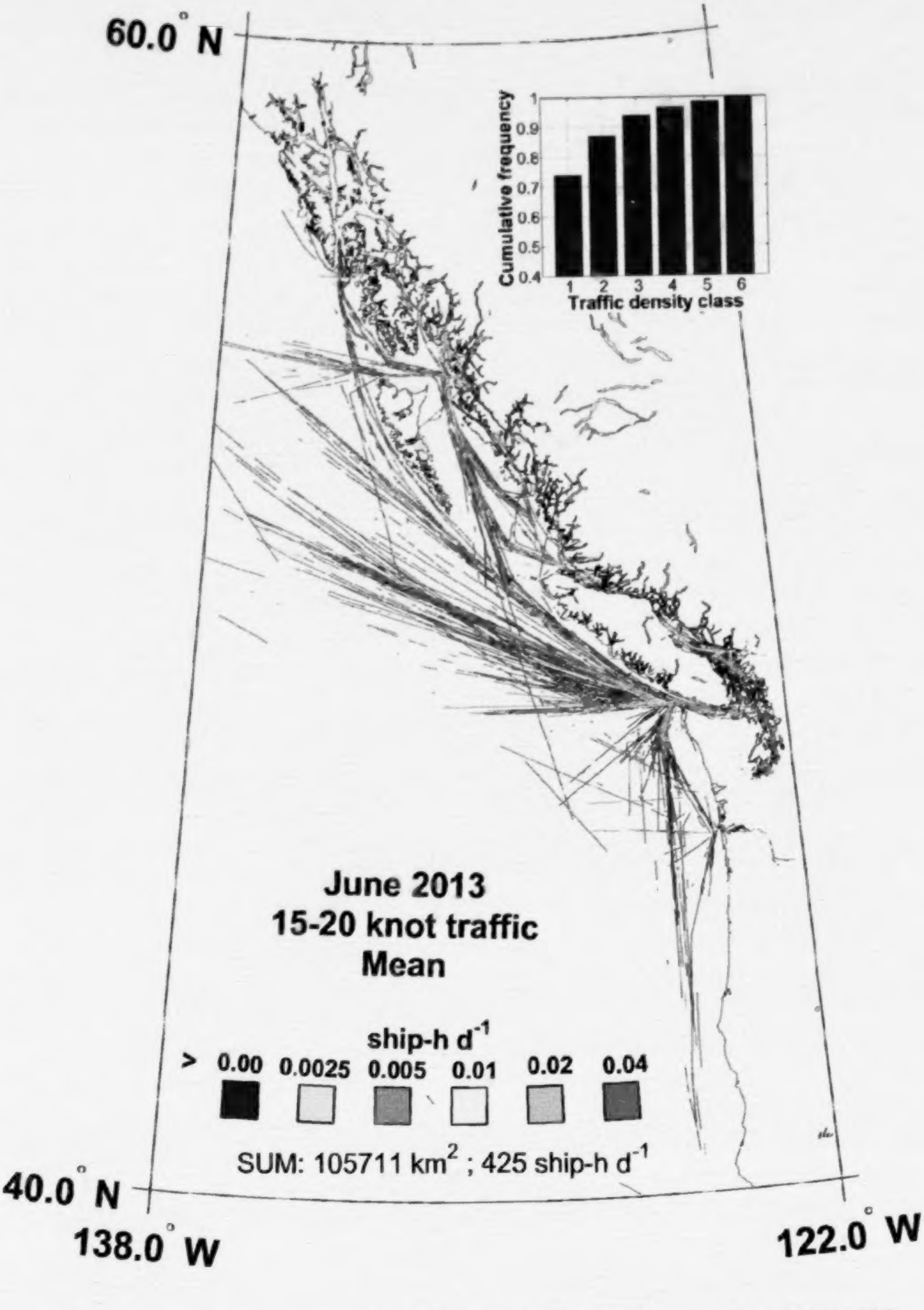

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
June 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 105711 km^2 ; 425 ship-h d^{-1}

Figure 162. Map of 15–20 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

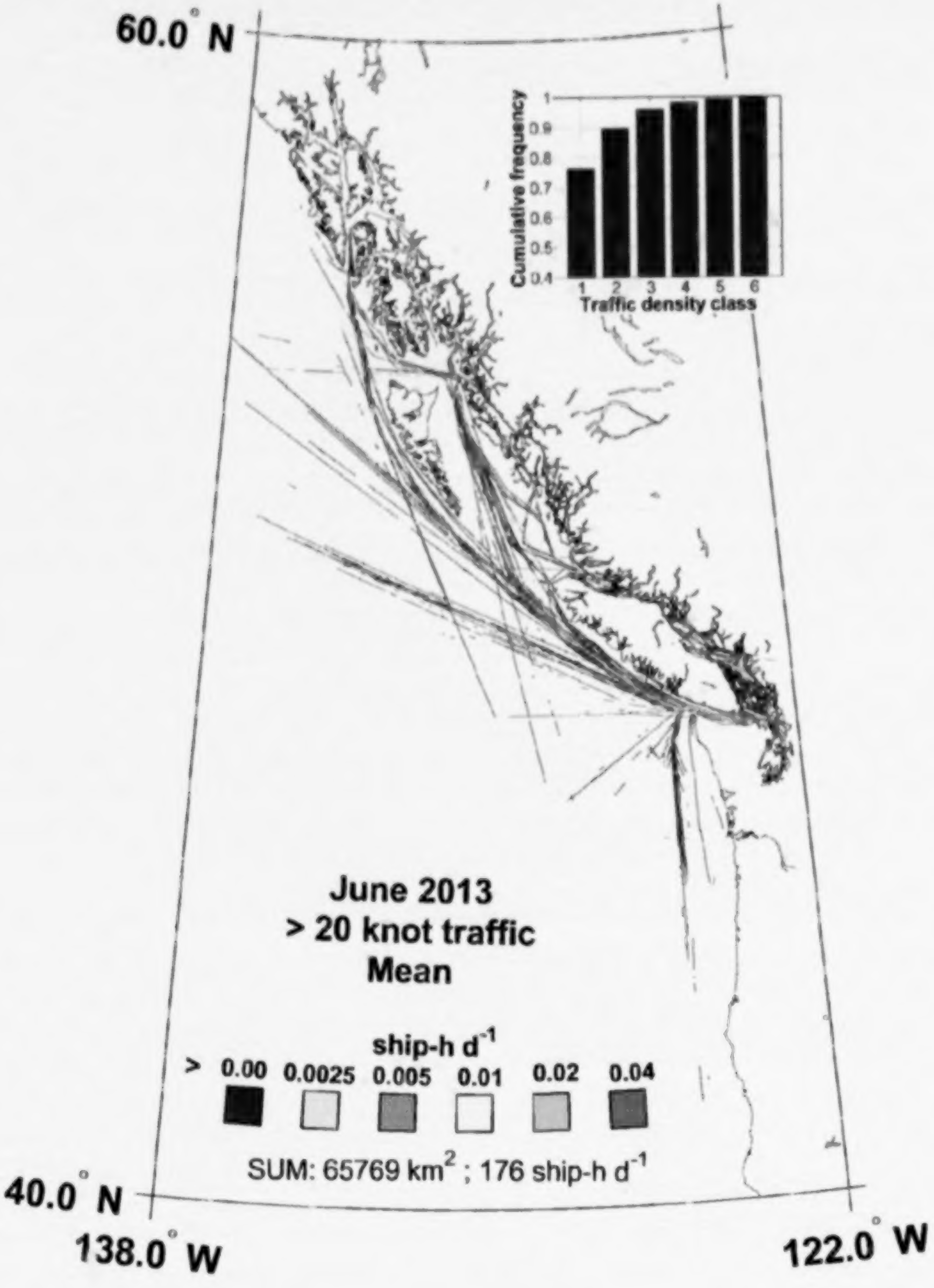

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
June 2013
> 20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 65769 km^2 ; 176 ship-h d^{-1}

Figure 163. Map of >20 knot AIS mean traffic density in June 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.7. July 2013

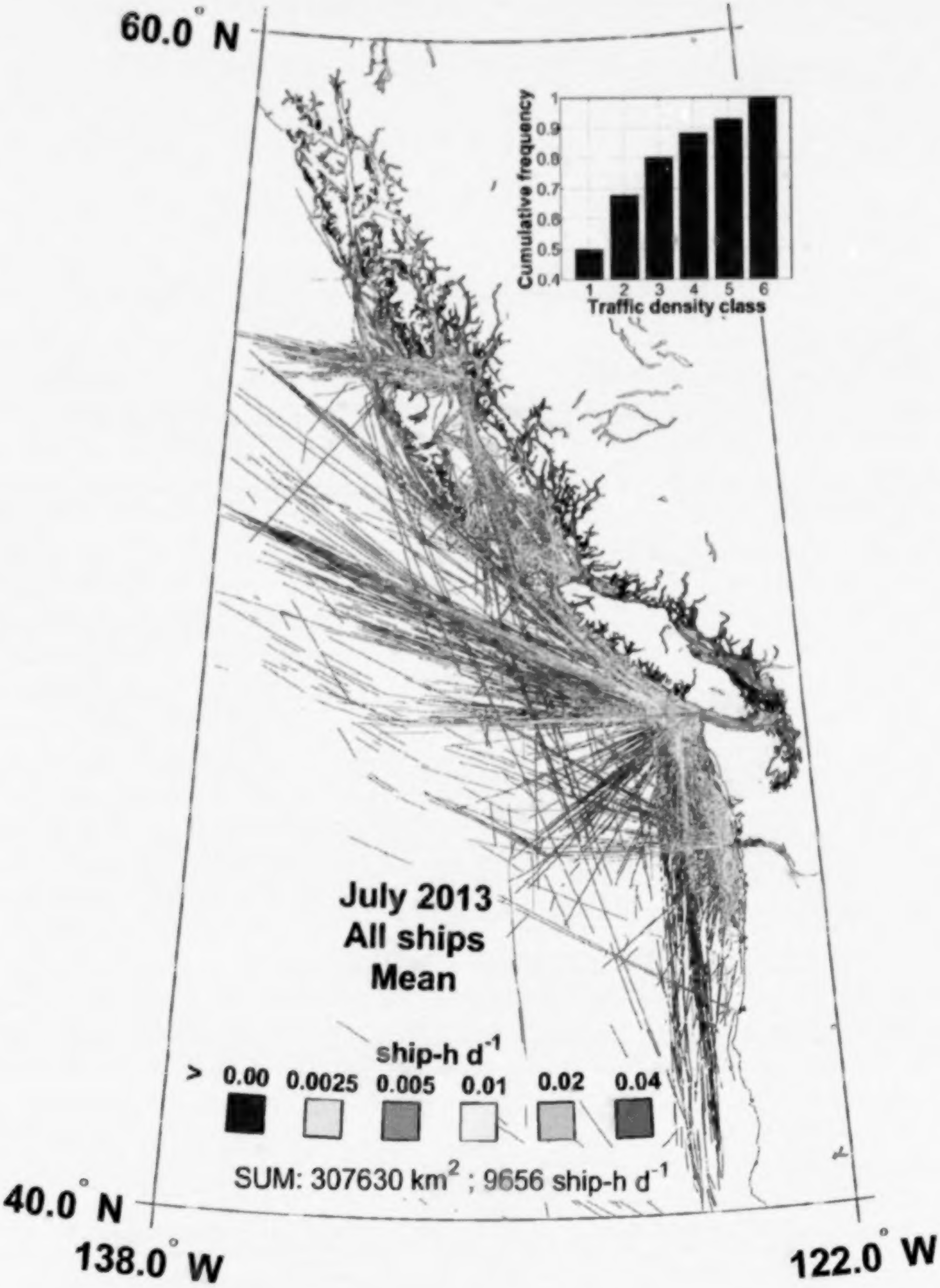

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
All ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 307630 km^2 ; 9656 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 164. Map of AIS mean traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

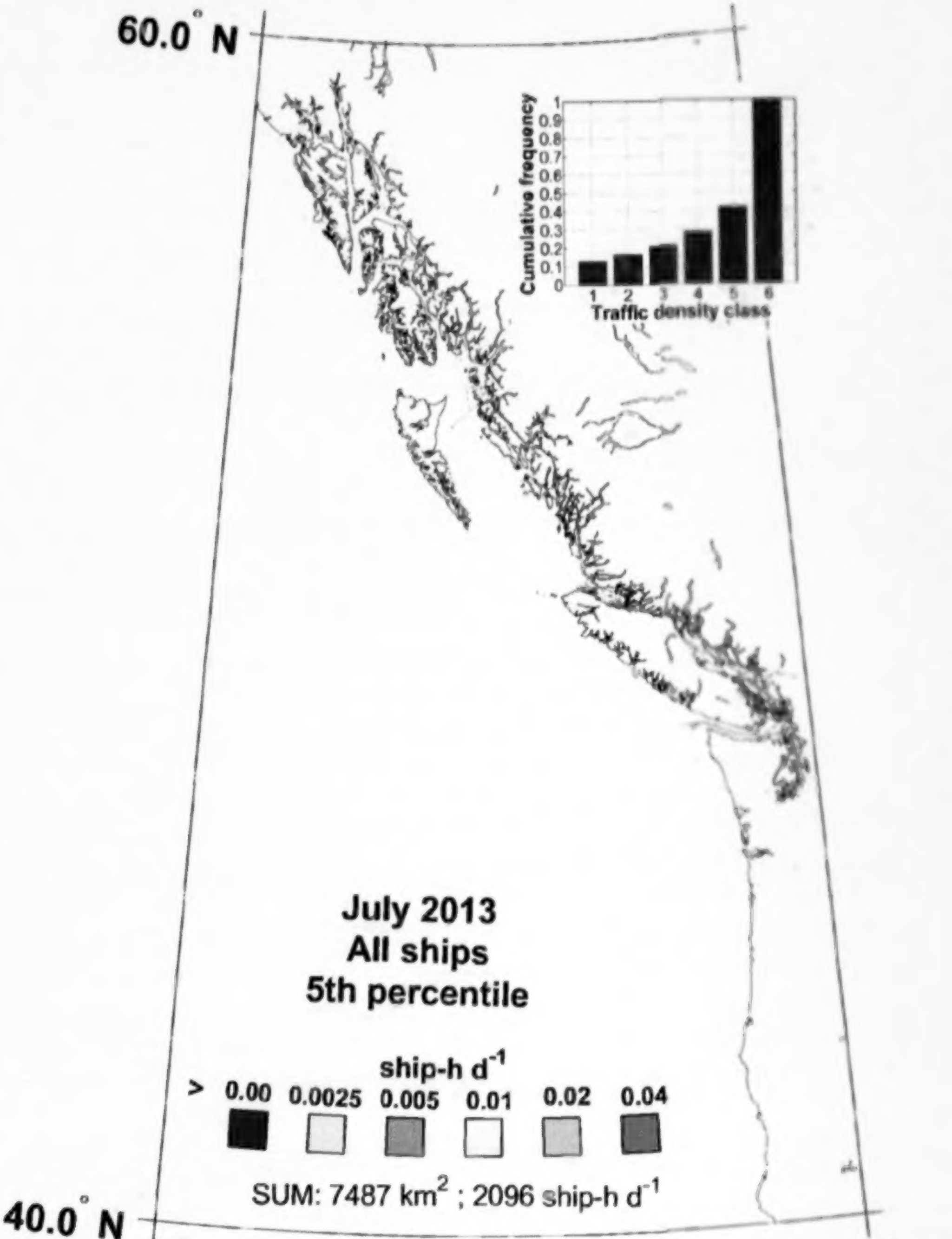

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
July 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7487 km^2 ; 2096 ship-h d^{-1}

Figure 165. Map of the 5th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

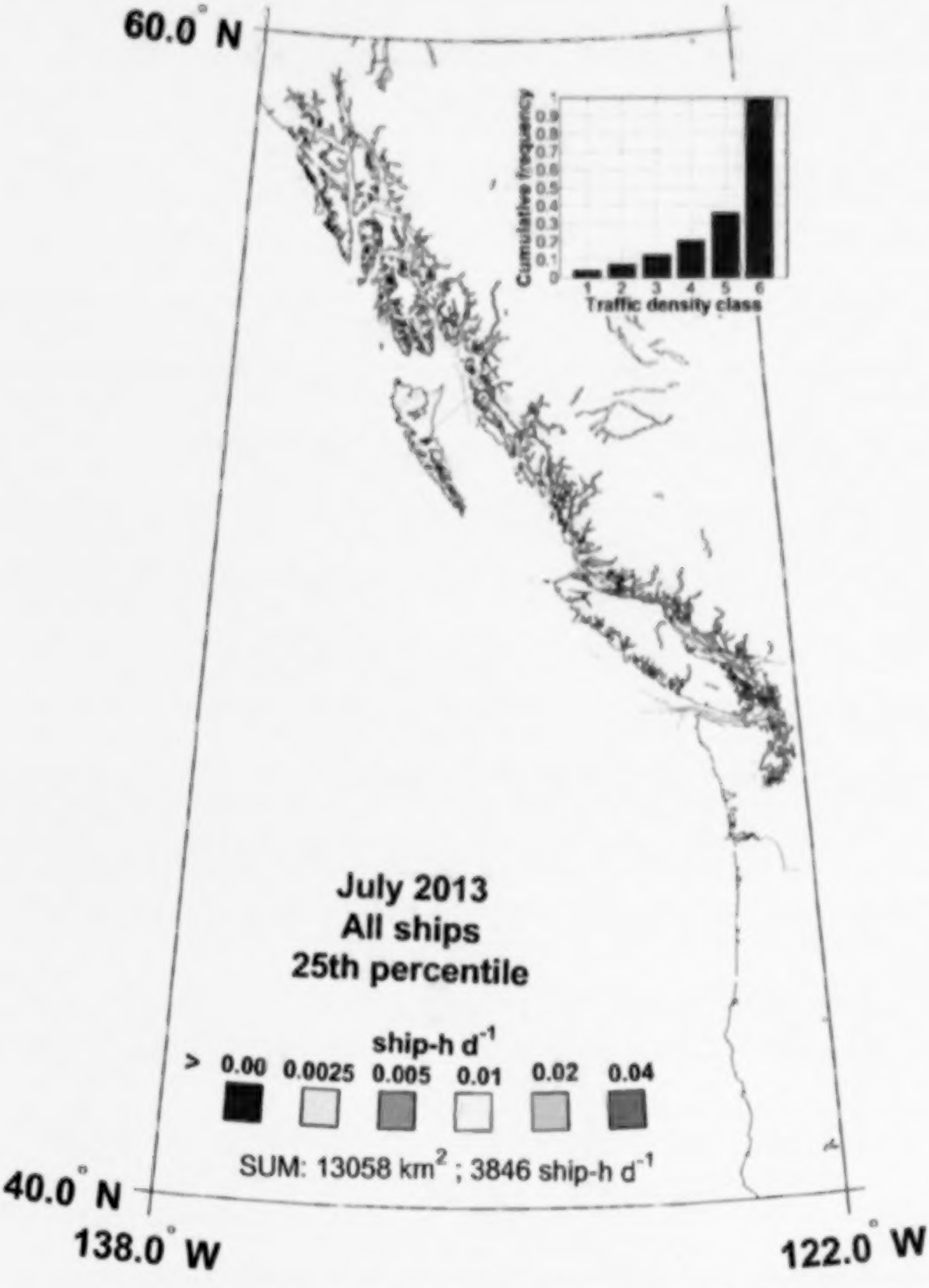

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
July 2013
All ships
25th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 13058 km2 ; 3846 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 166. Map of the 25^{th} percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

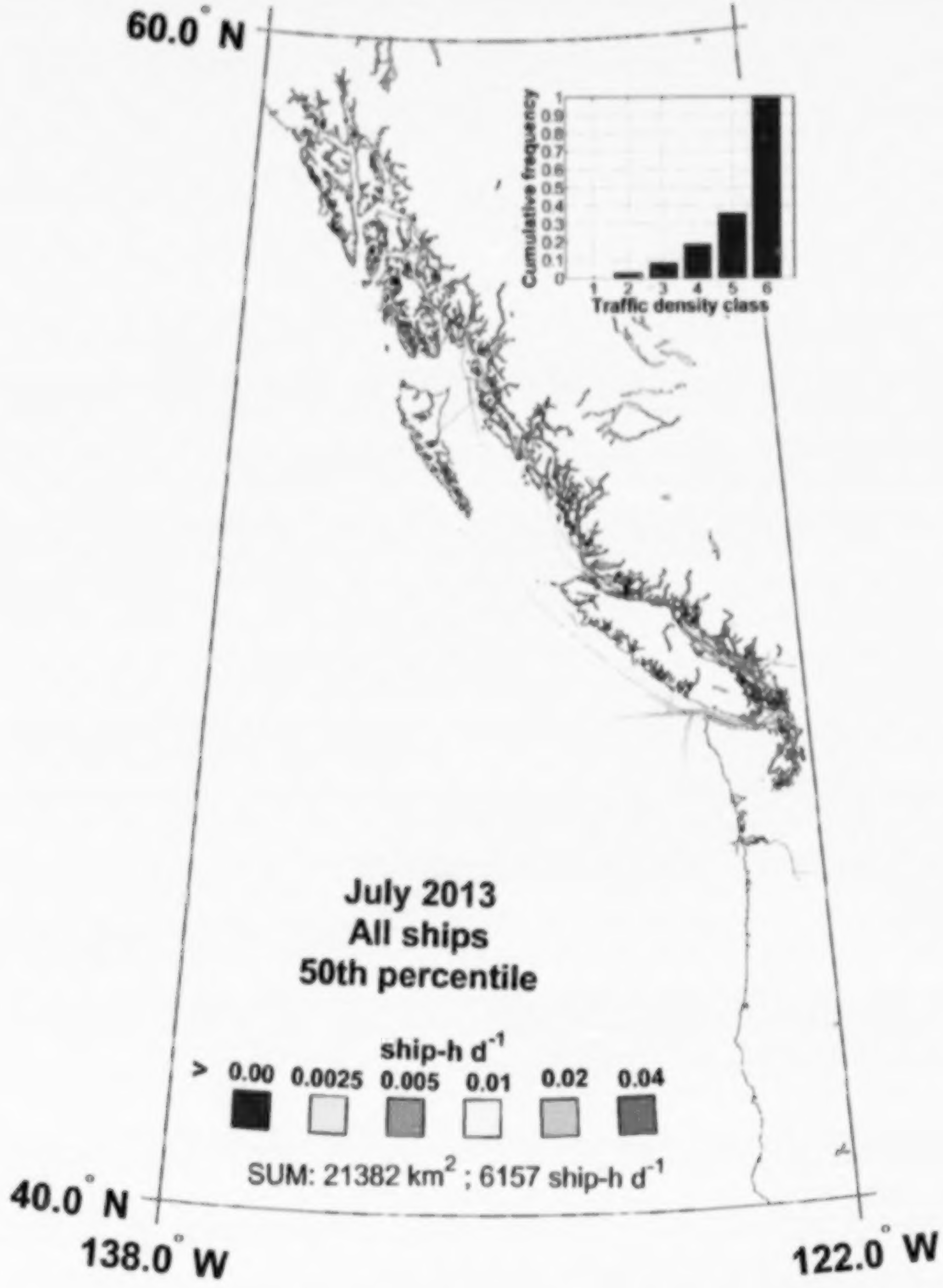

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
July 2013
All ships
50th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 21382 km2 ; 6157 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 167. Map of the 50th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

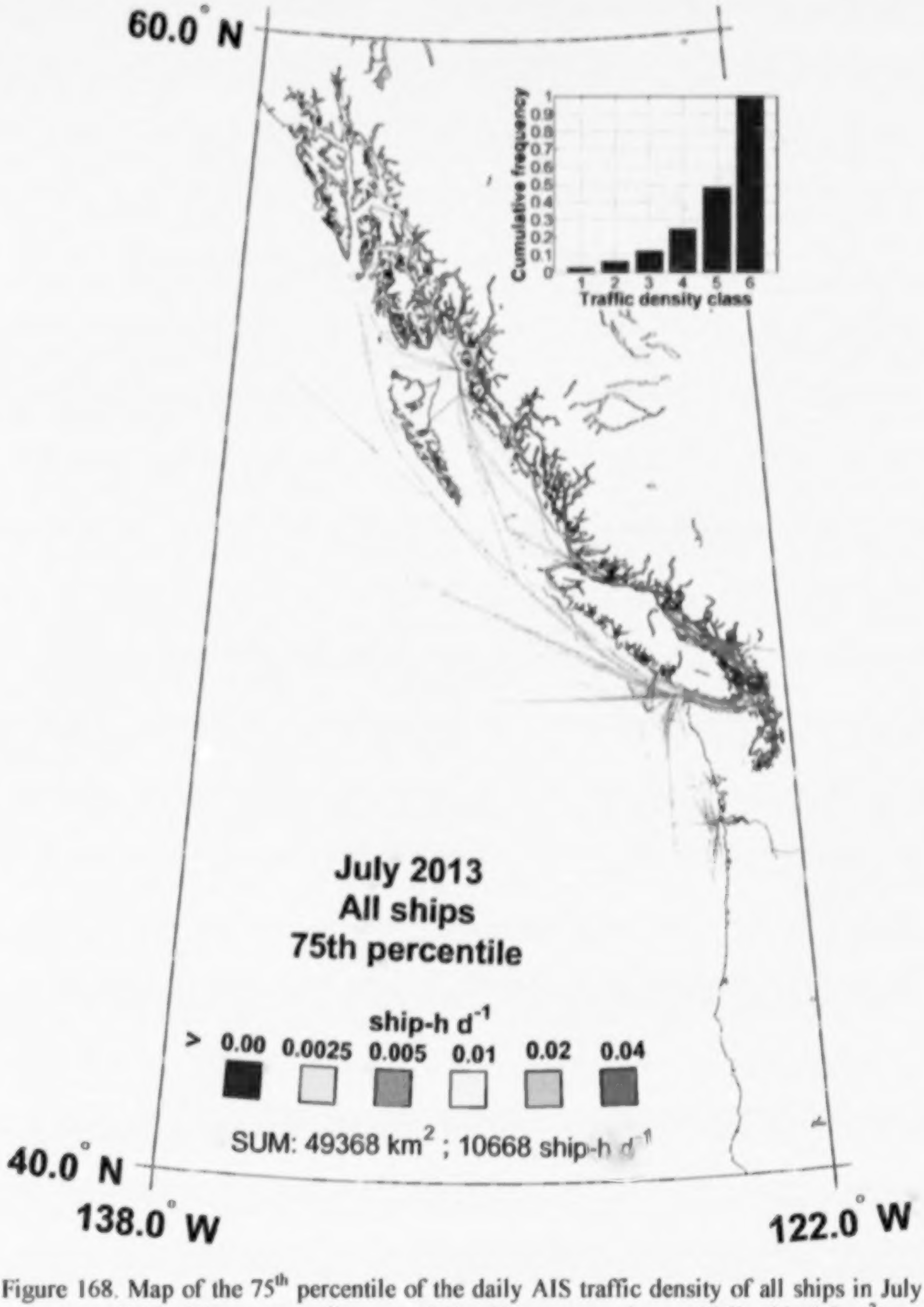

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
July 2013
All ships
75th percentile
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 49368 km2 ; 10668 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 168. Map of the 75th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

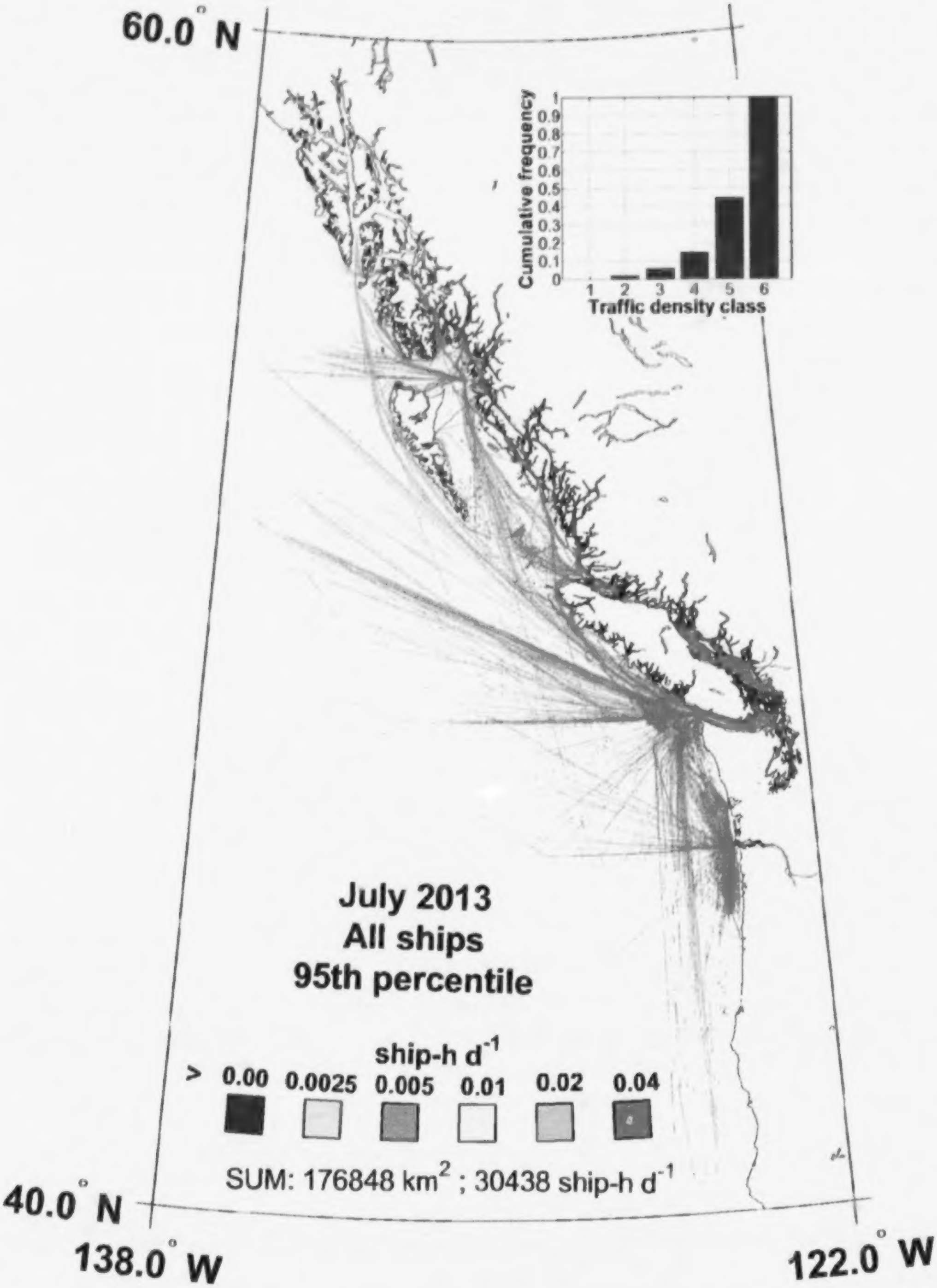

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
July 2013
All ships
95th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 176848 km² ; 30438 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 169. Map of the 95th percentile of the daily AIS traffic density of all ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

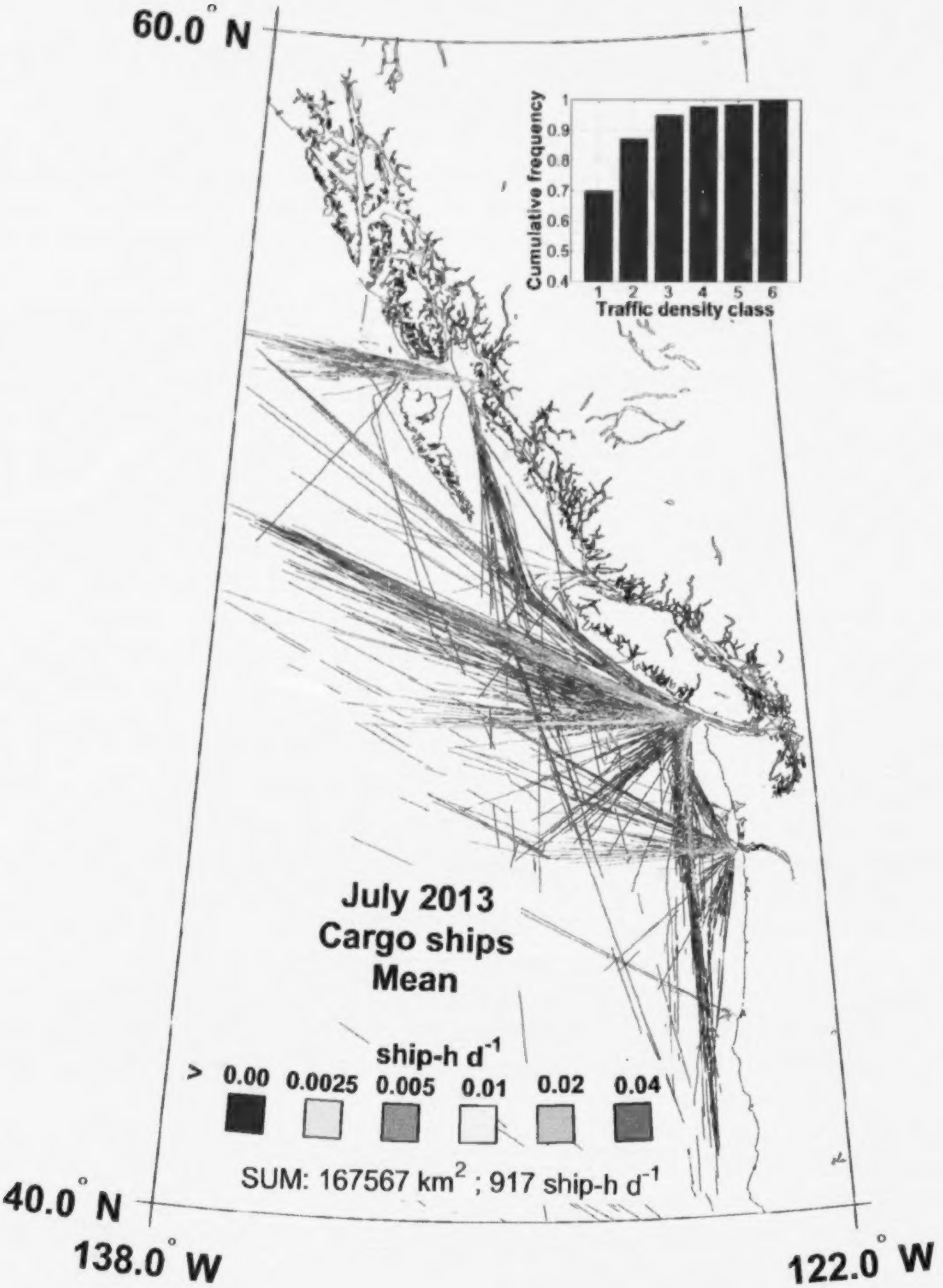

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 167567 km^2 ; 917 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 170. Map of AIS mean traffic density of cargo-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

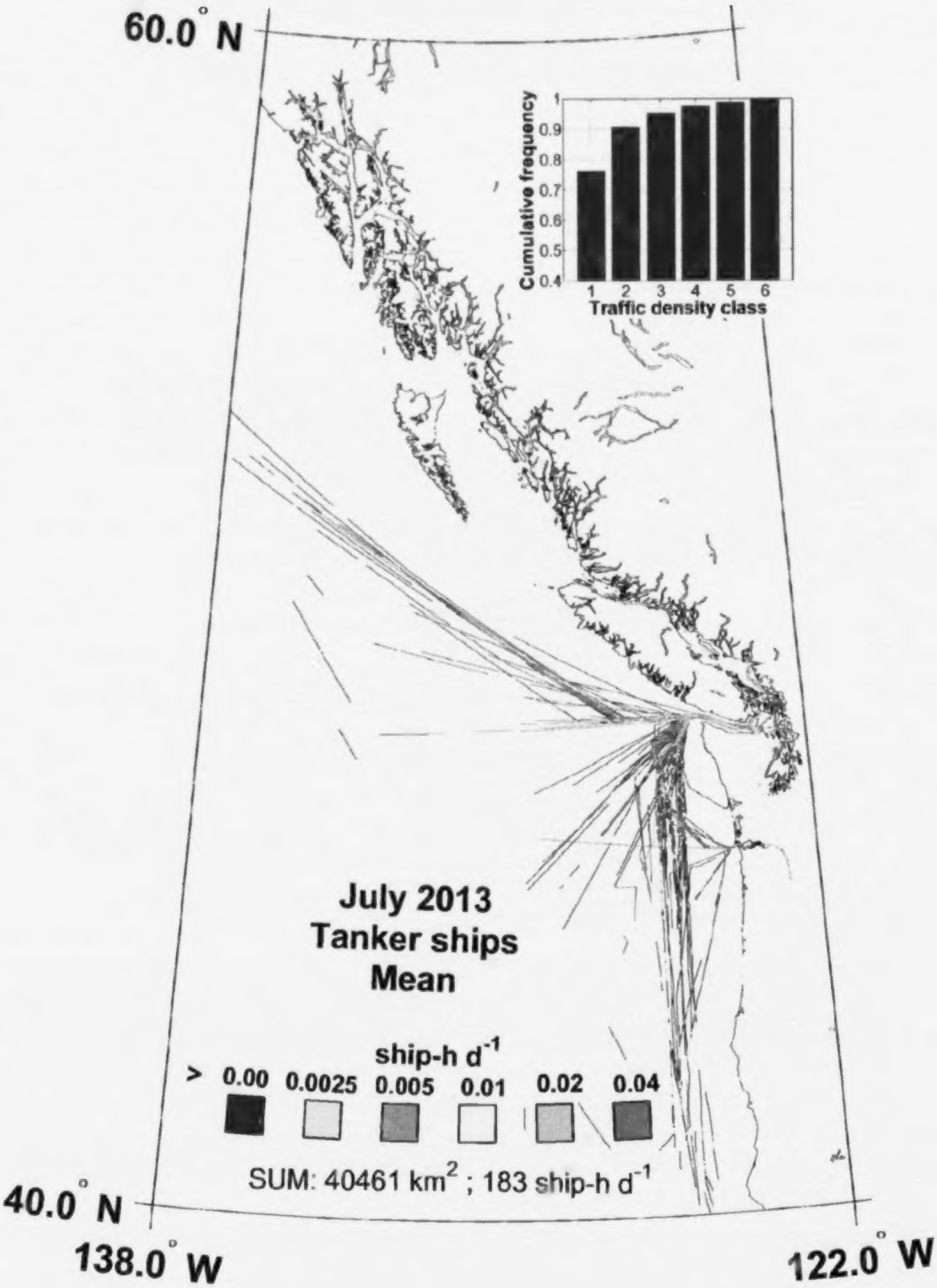

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Tanker ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 40461 km² ; 183 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 171. Map of AIS mean traffic density of tanker-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

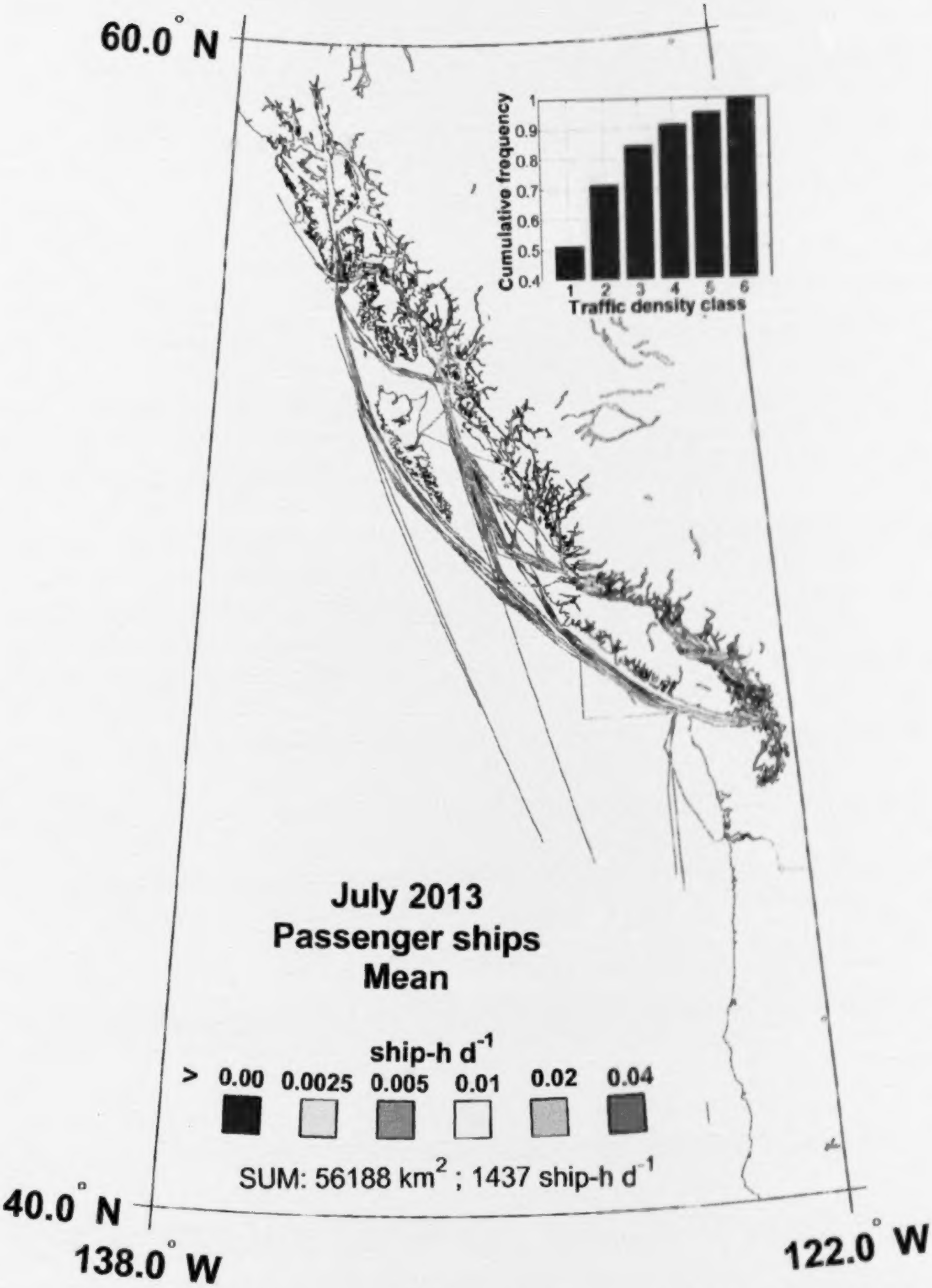

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 56188 km^2 ; 1437 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 172. Map of AIS mean traffic density of passenger-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

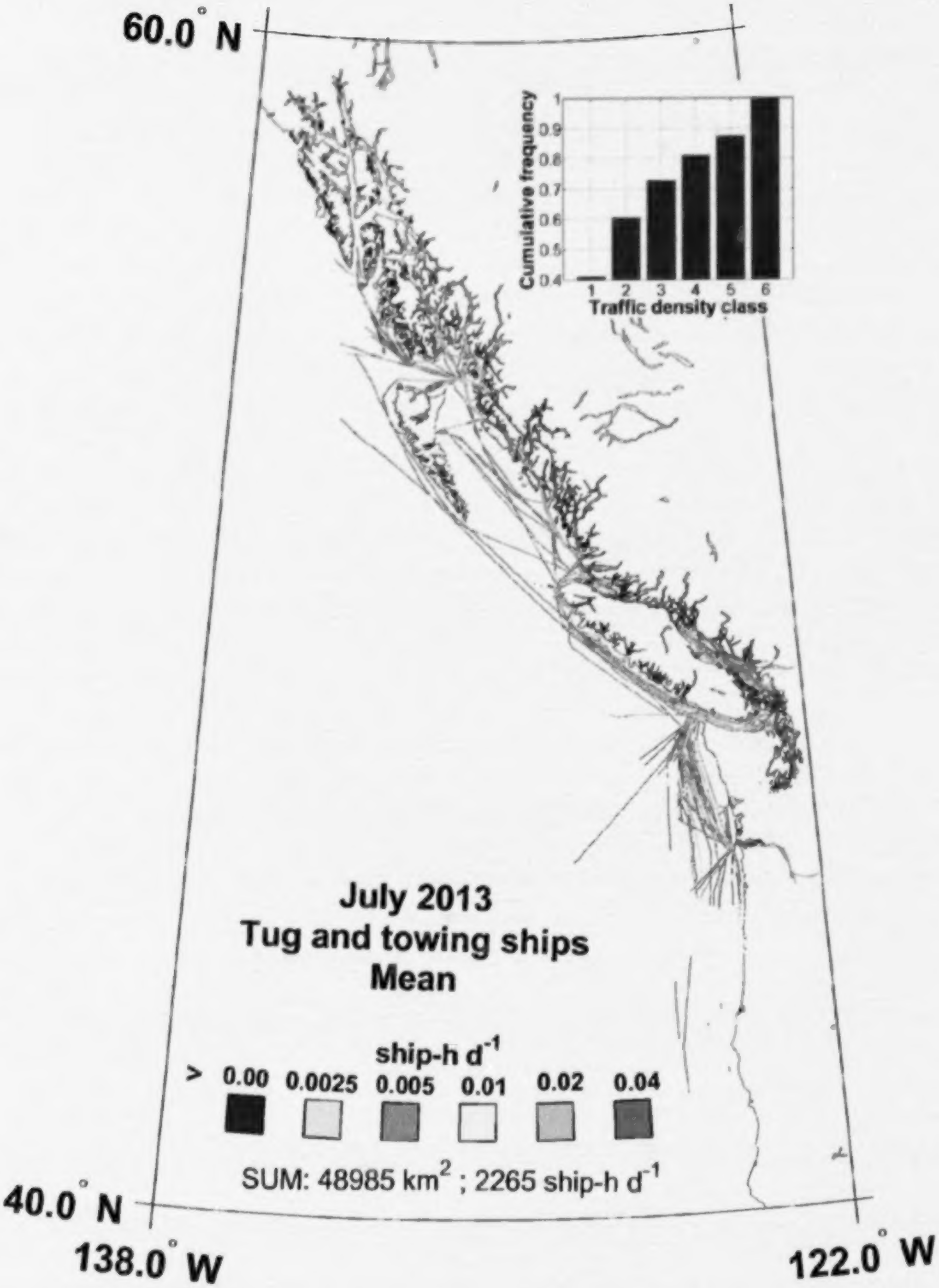

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 48985 km^2 ; 2265 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 173. Map of AIS mean traffic density of tug and towing -type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

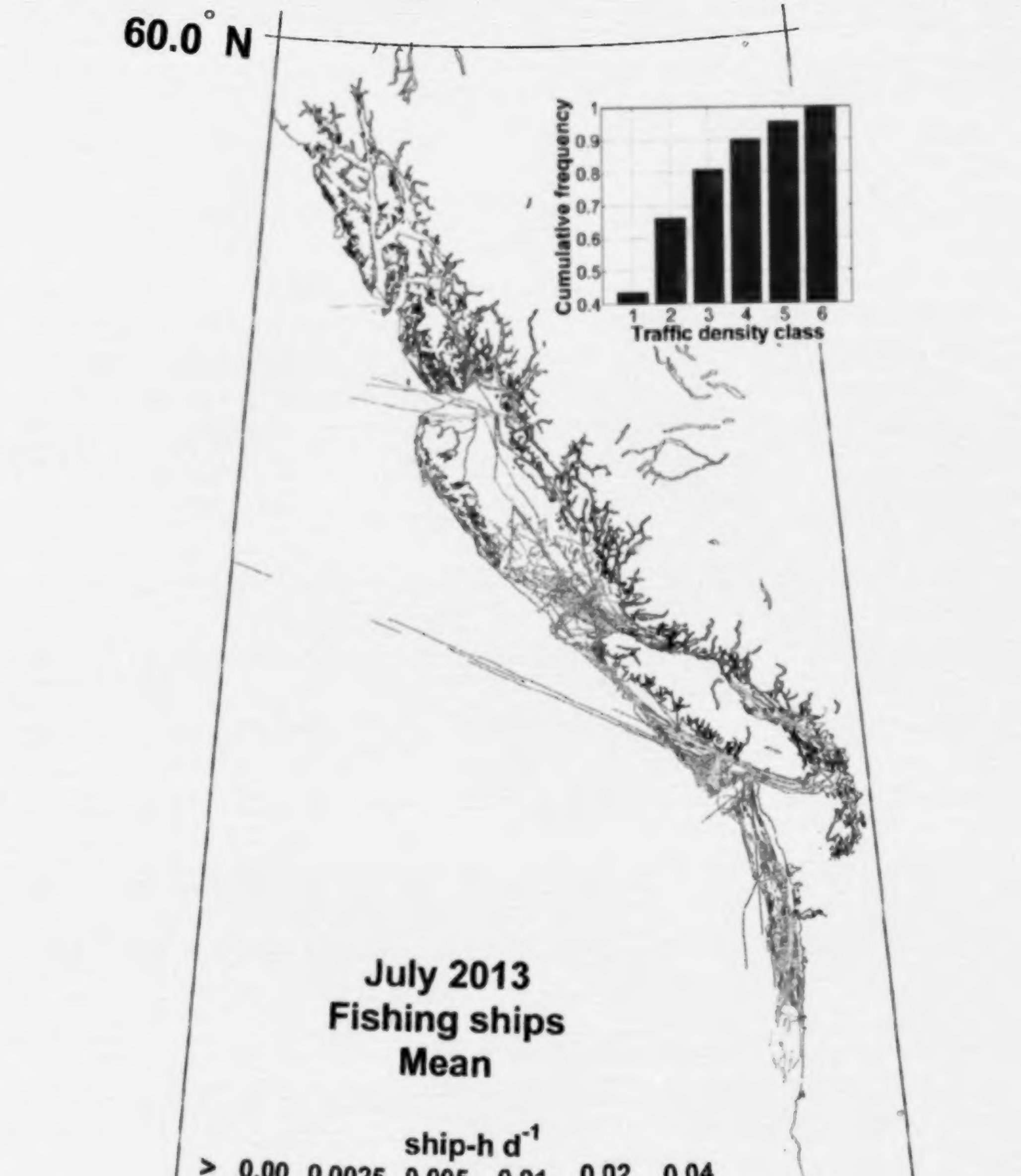

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 57716 km^2 ; 792 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 174. Map of AIS mean traffic density of fishing-type ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

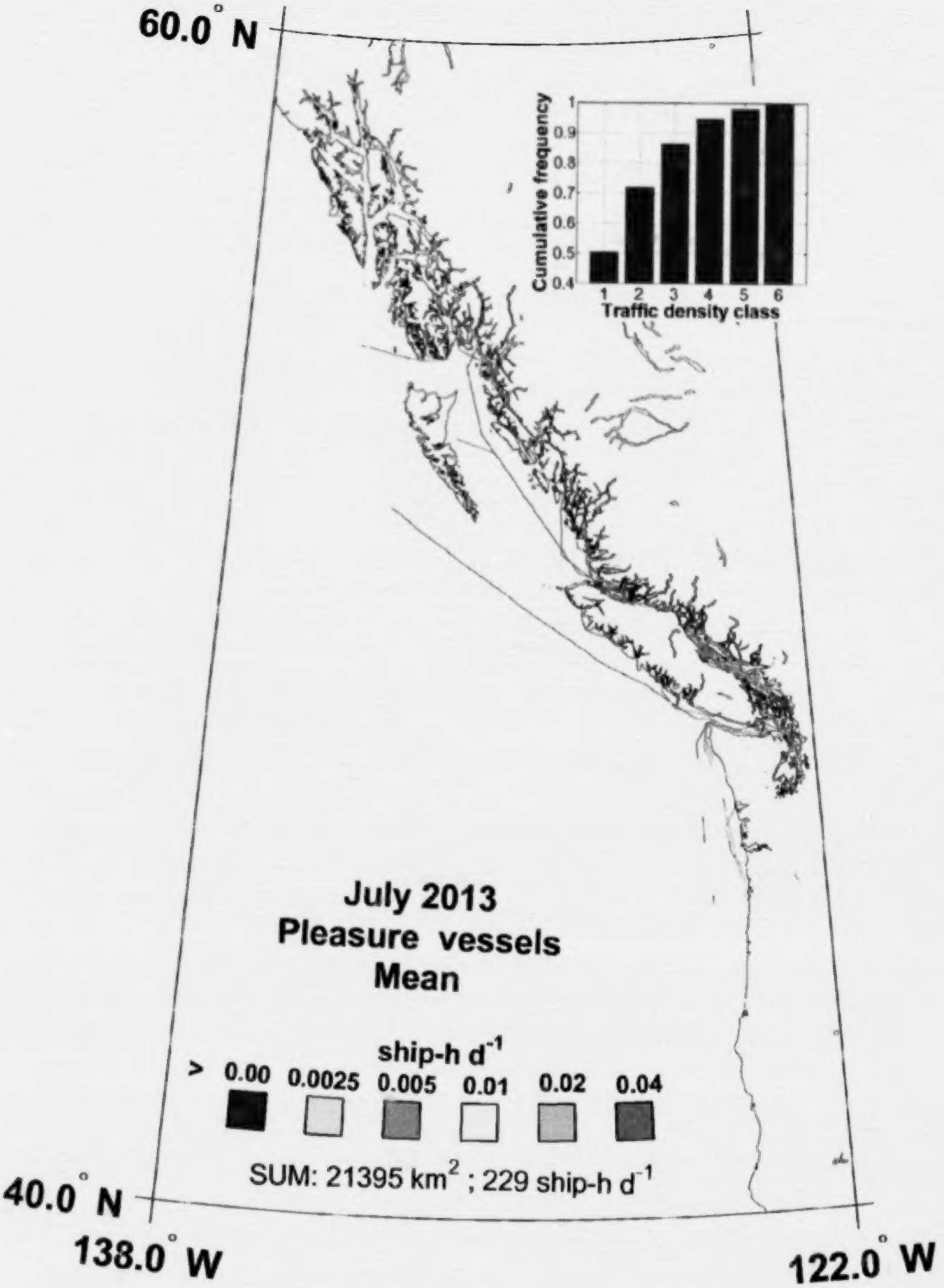

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Pleasure vessels
Mean
ship-h d^-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 21395 km² ; 229 ship-h d^-1

Figure 175. Map of AIS mean traffic density of pleasure-type vessels in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

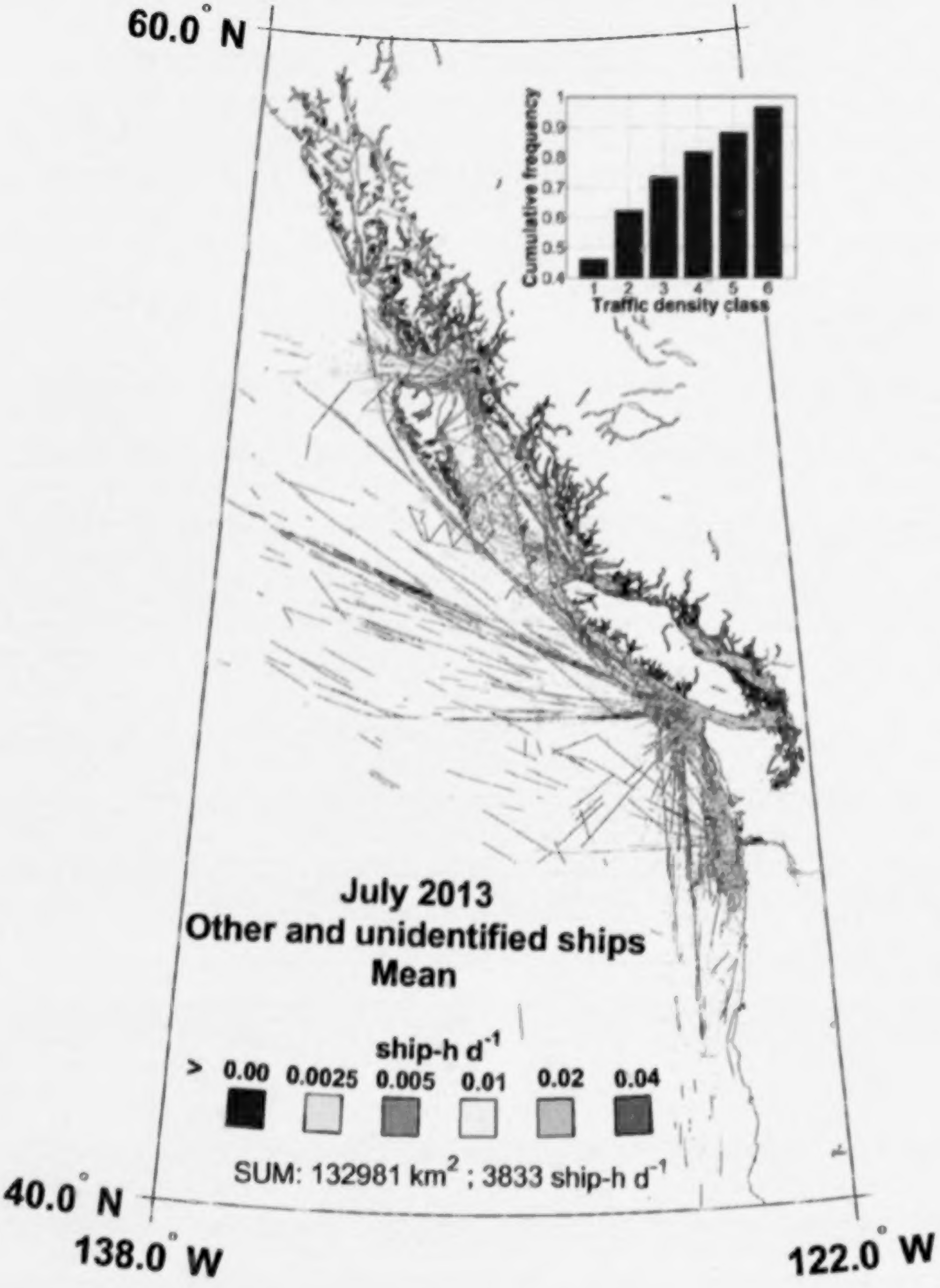

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
Other and unidentified ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 132981 km² ; 3833 ship-h d⁻¹

Figure 176. Map of AIS mean traffic density of other type of ships and ships of unidentified type in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

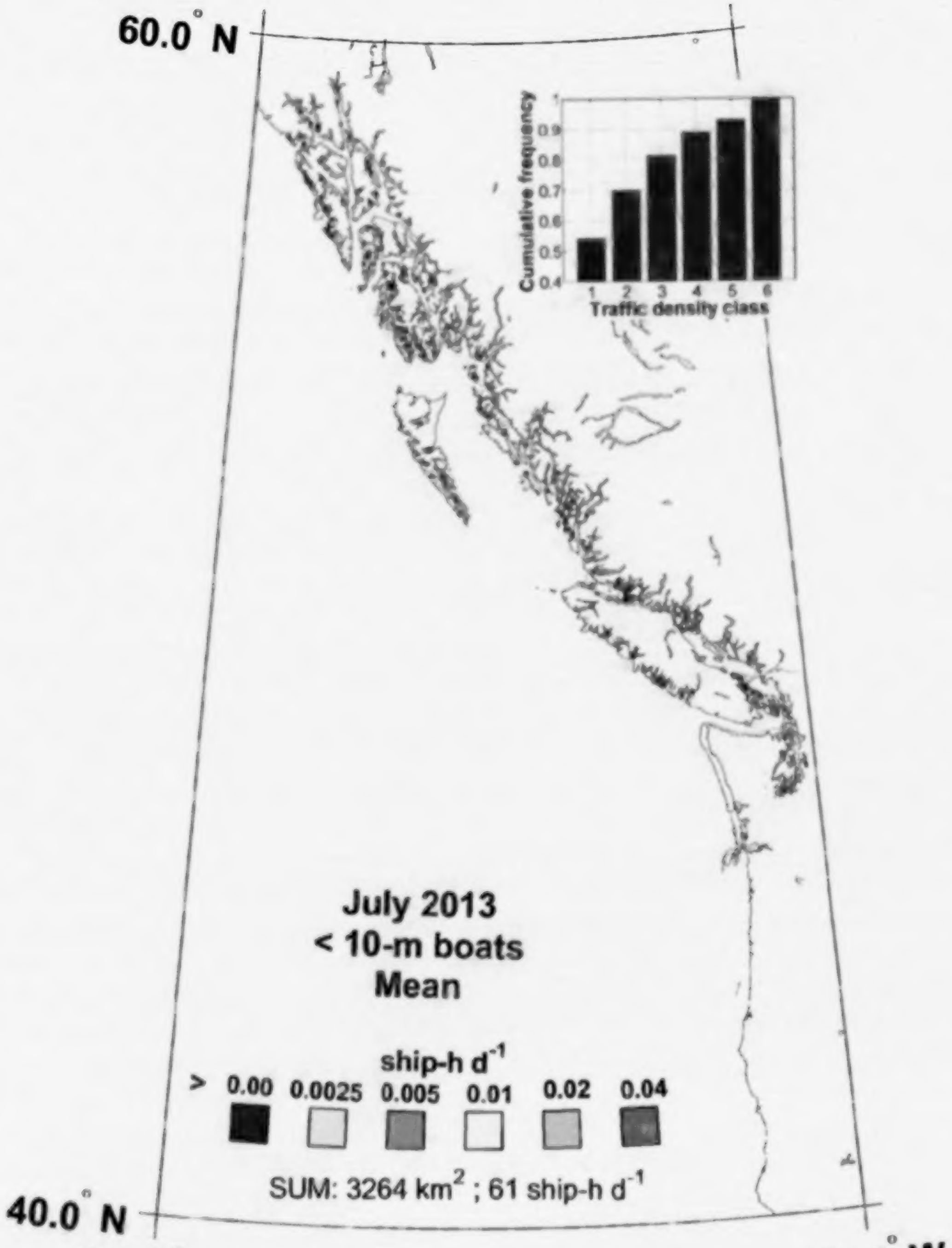

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
< 10-m boats
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 3264 km2 ; 61 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 177. Map of AIS mean traffic density of ships with lengths < 10 min July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

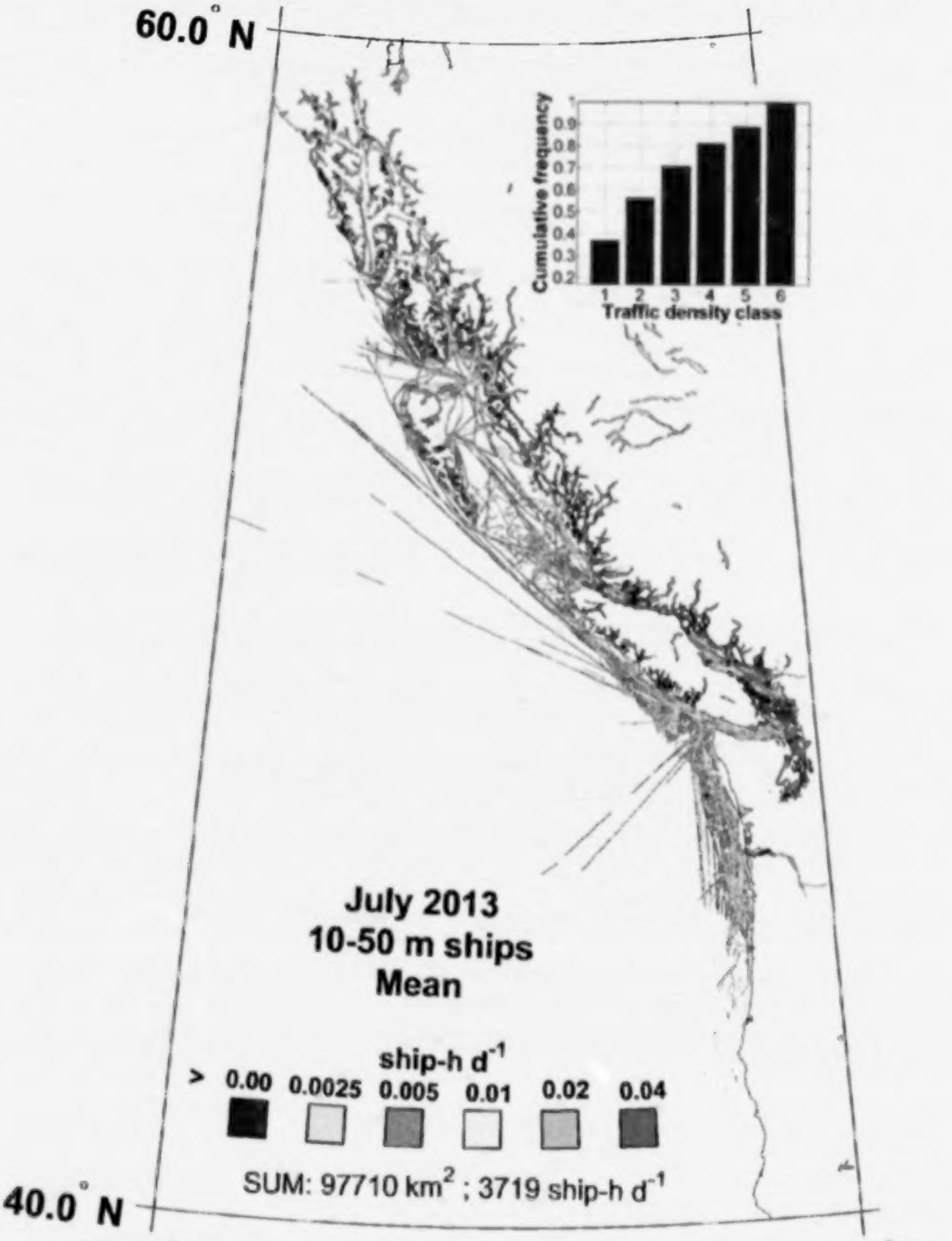

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
July 2013
10-50 m ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 97710 km² ; 3719 ship-h d⁻¹

Figure 178. Map of AIS mean traffic density of 10 to 50 m ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

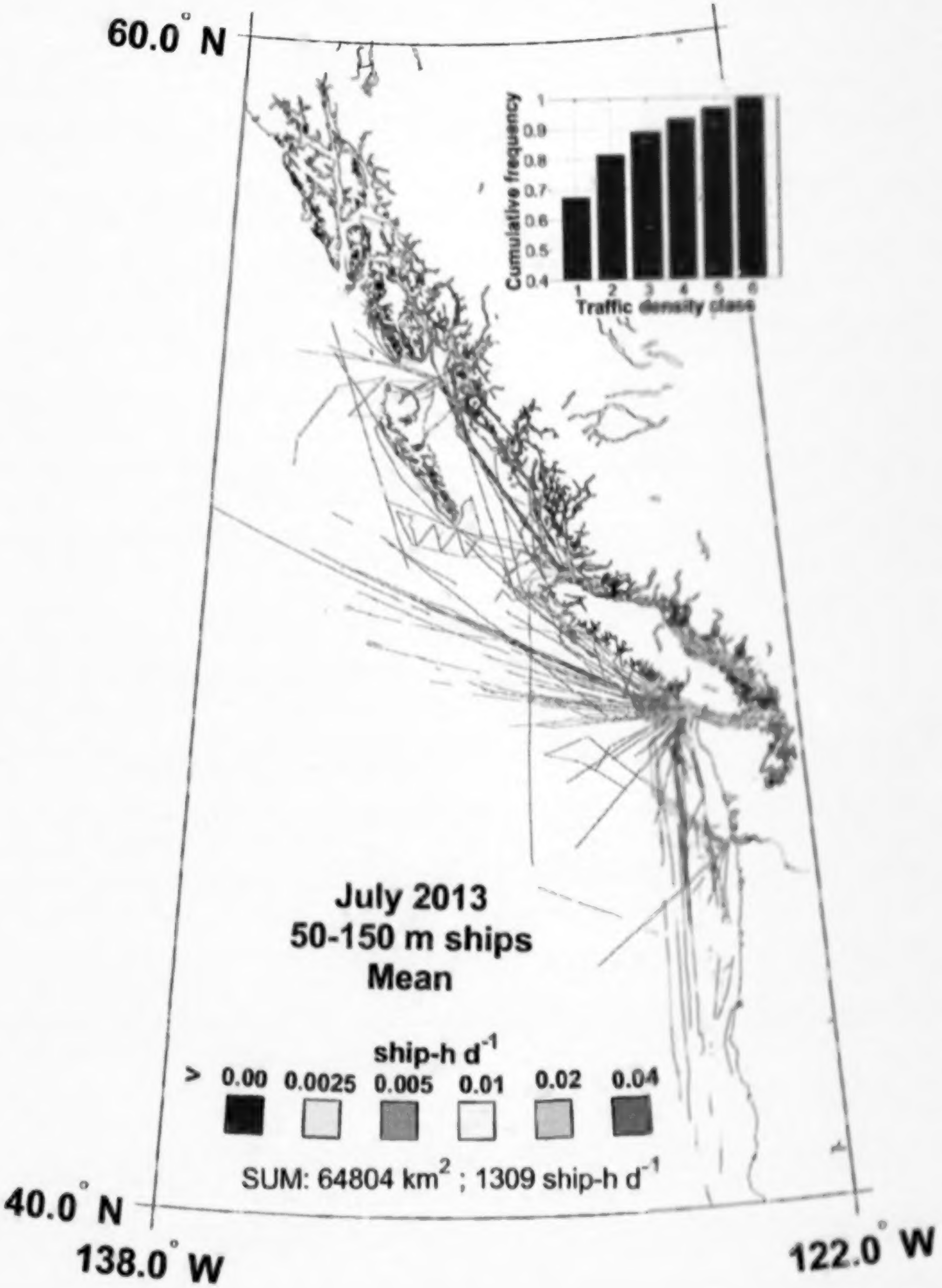

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
50-150 m ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 64804 km² ; 1309 ship-h d⁻¹

Figure 179. Map of AIS mean traffic density of 50 to 150 m ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

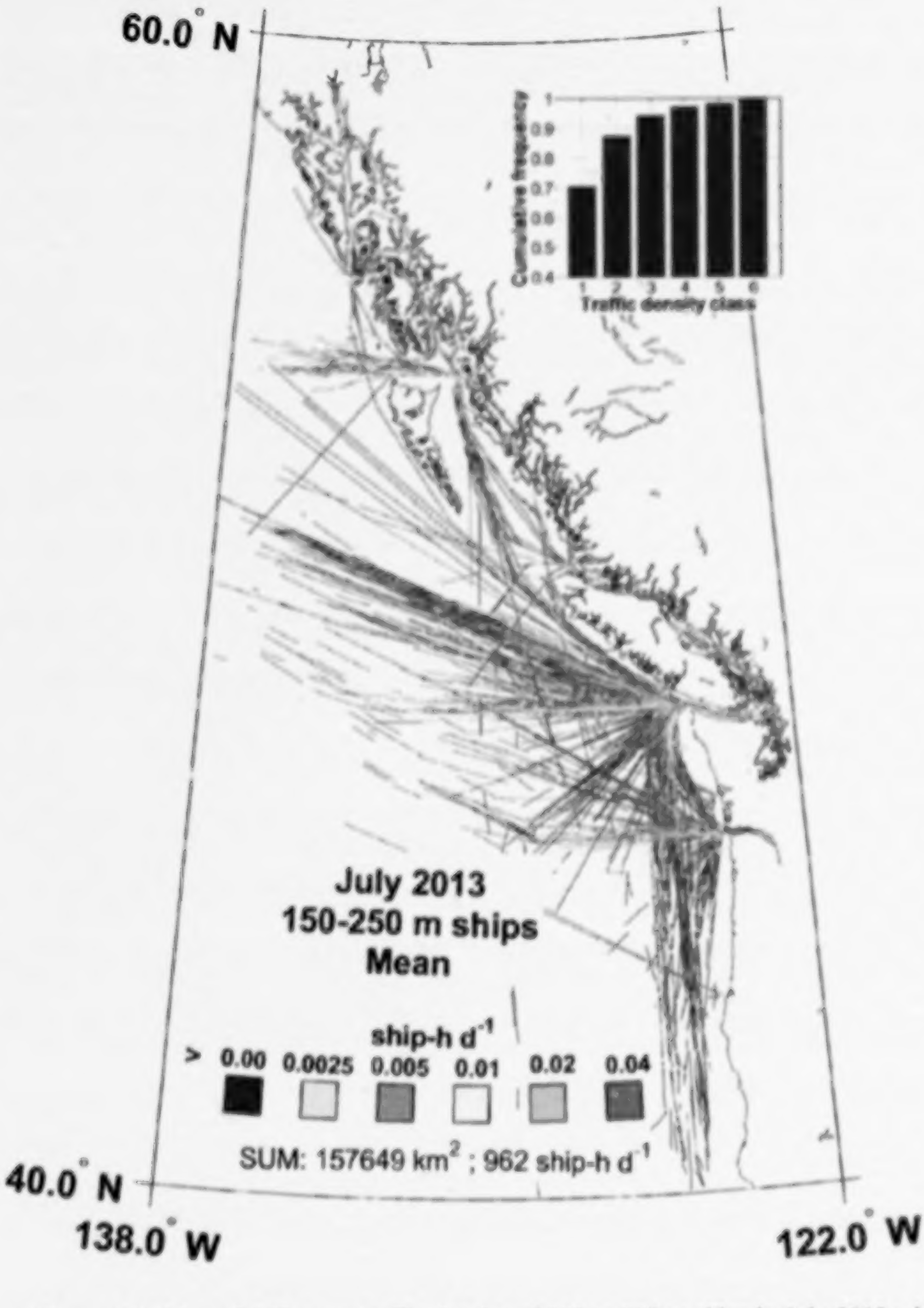

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
July 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 157649 km^2 ; 962 ship-h d^{-1}

Figure 180. Map of AIS mean traffic density of 150 to 250 m ships in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

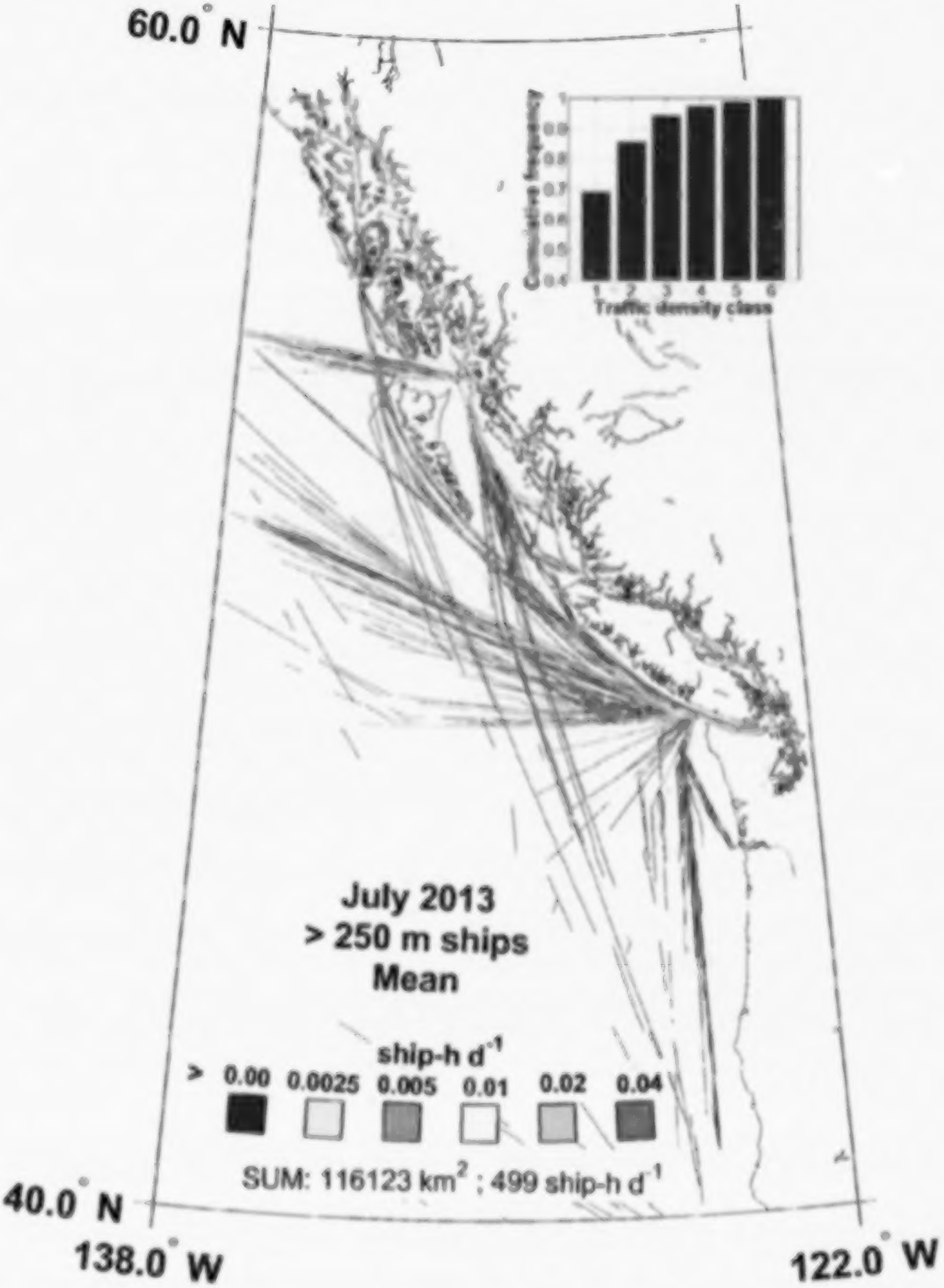

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
July 2013
> 250 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 116123 km² ; 499 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 181. Map of >250 m ship AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

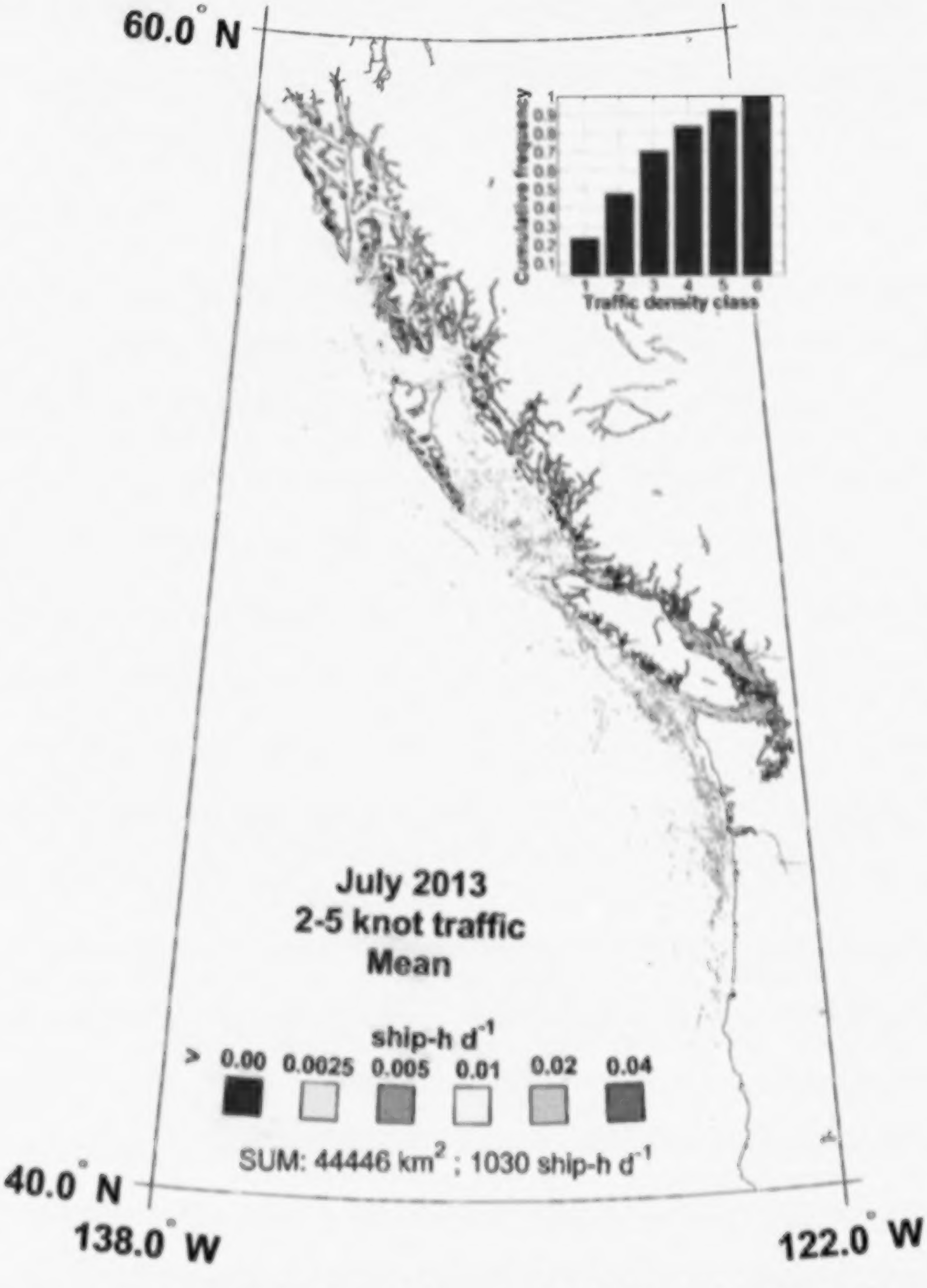

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
July 2013
2-5 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 44446 km² ; 1030 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 182. Map of 2–5 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

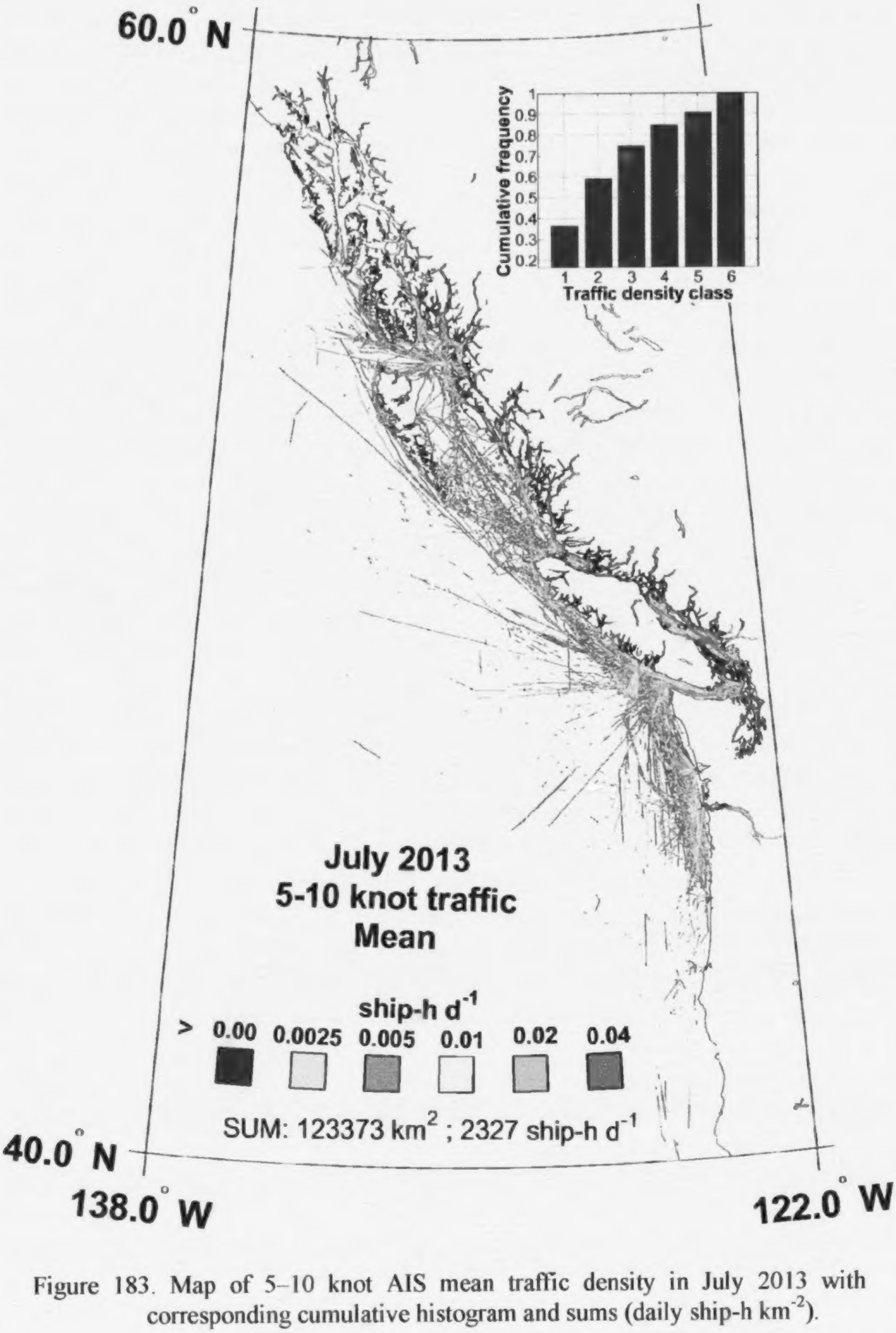

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
July 2013
5-10 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 123373 km2 ; 2327 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 183. Map of 5–10 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

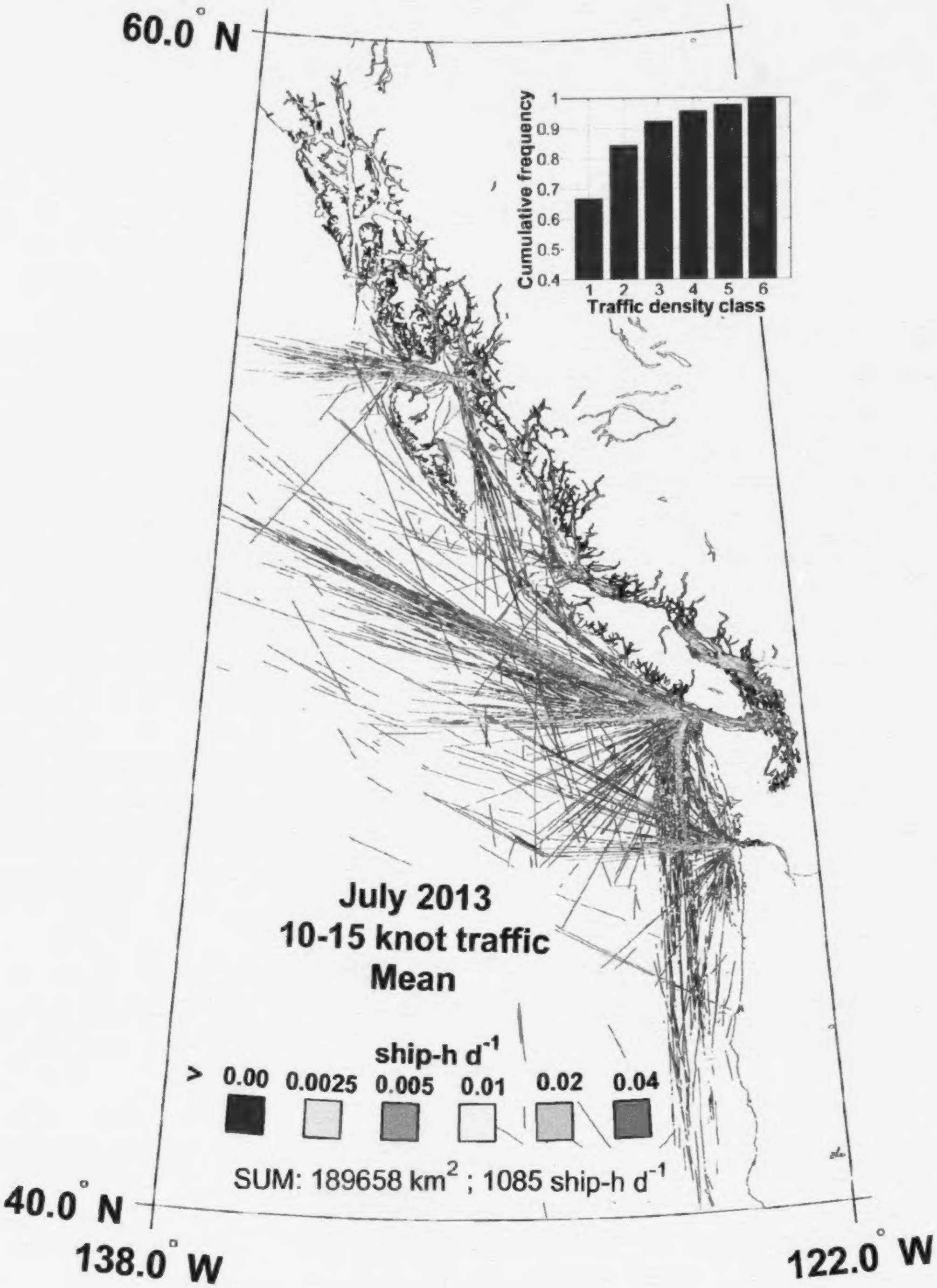

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 189658 km^2 ; 1085 ship-h d^{-1}

Figure 184. Map of 10–15 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

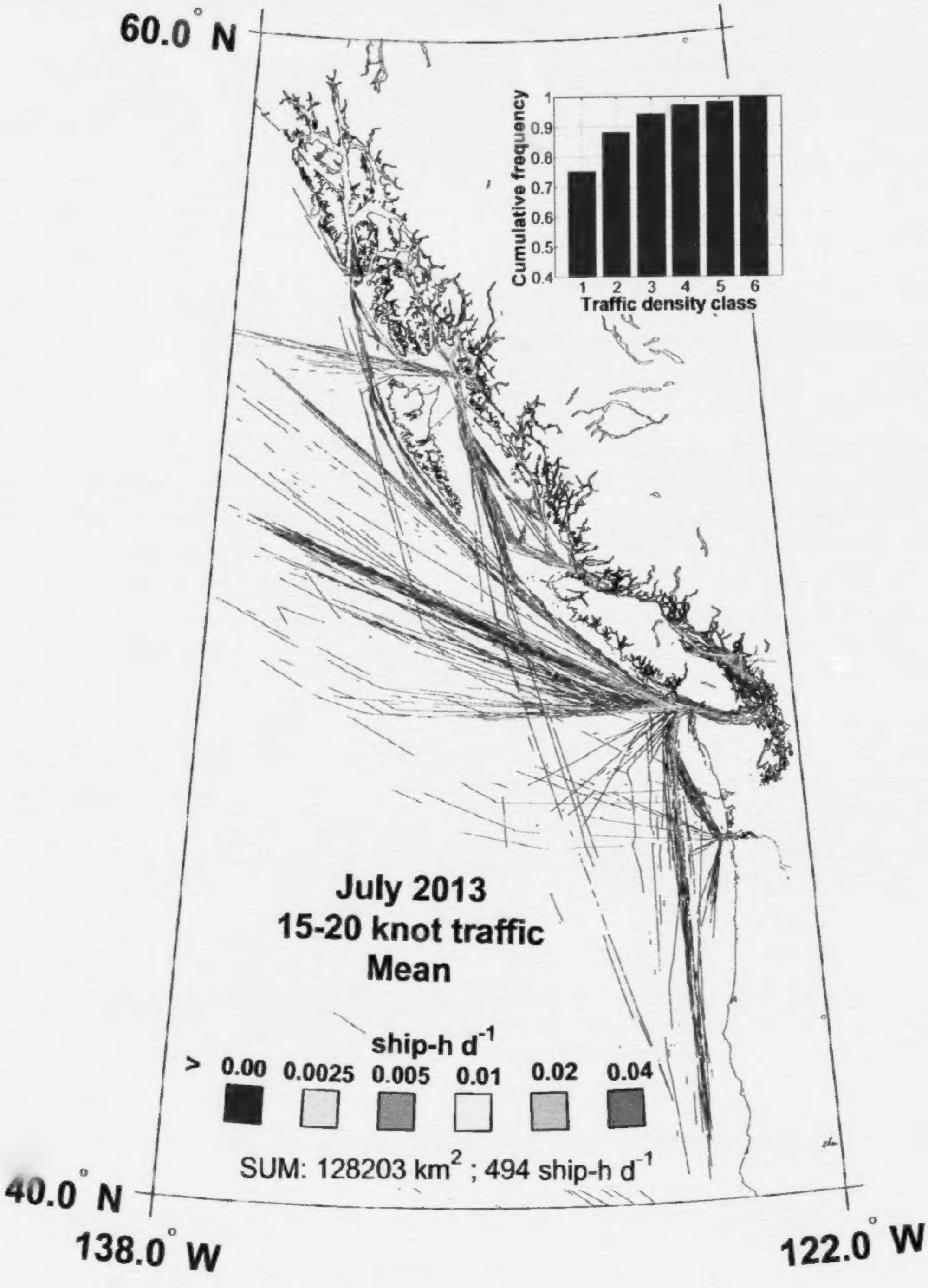

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
July 2013
15-20 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 128203 km² ; 494 ship-h d⁻¹

Figure 185. Map of 15–20 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

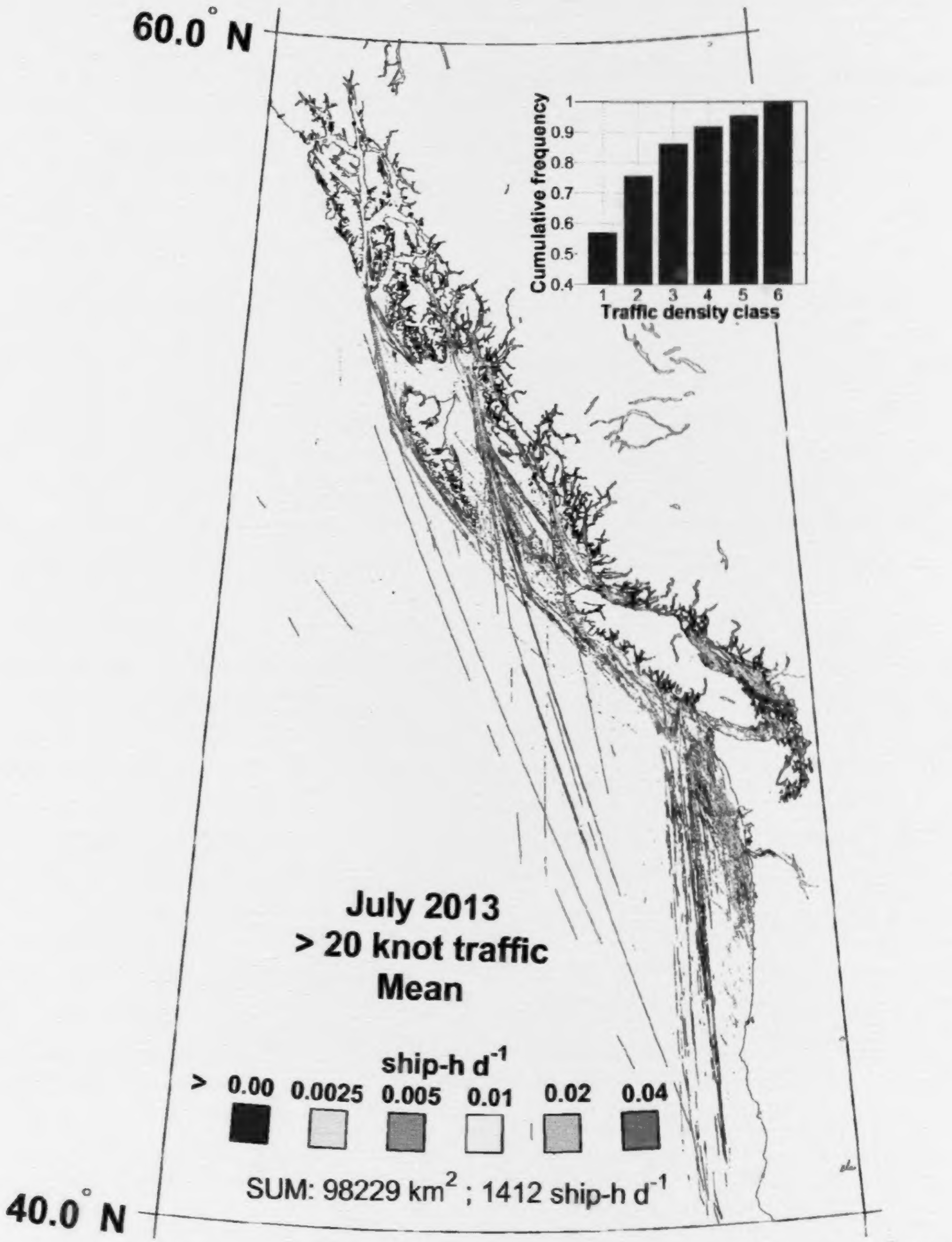

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
July 2013
> 20 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 98229 km2 ; 1412 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 186. Map of >20 knot AIS mean traffic density in July 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.8. August 2013

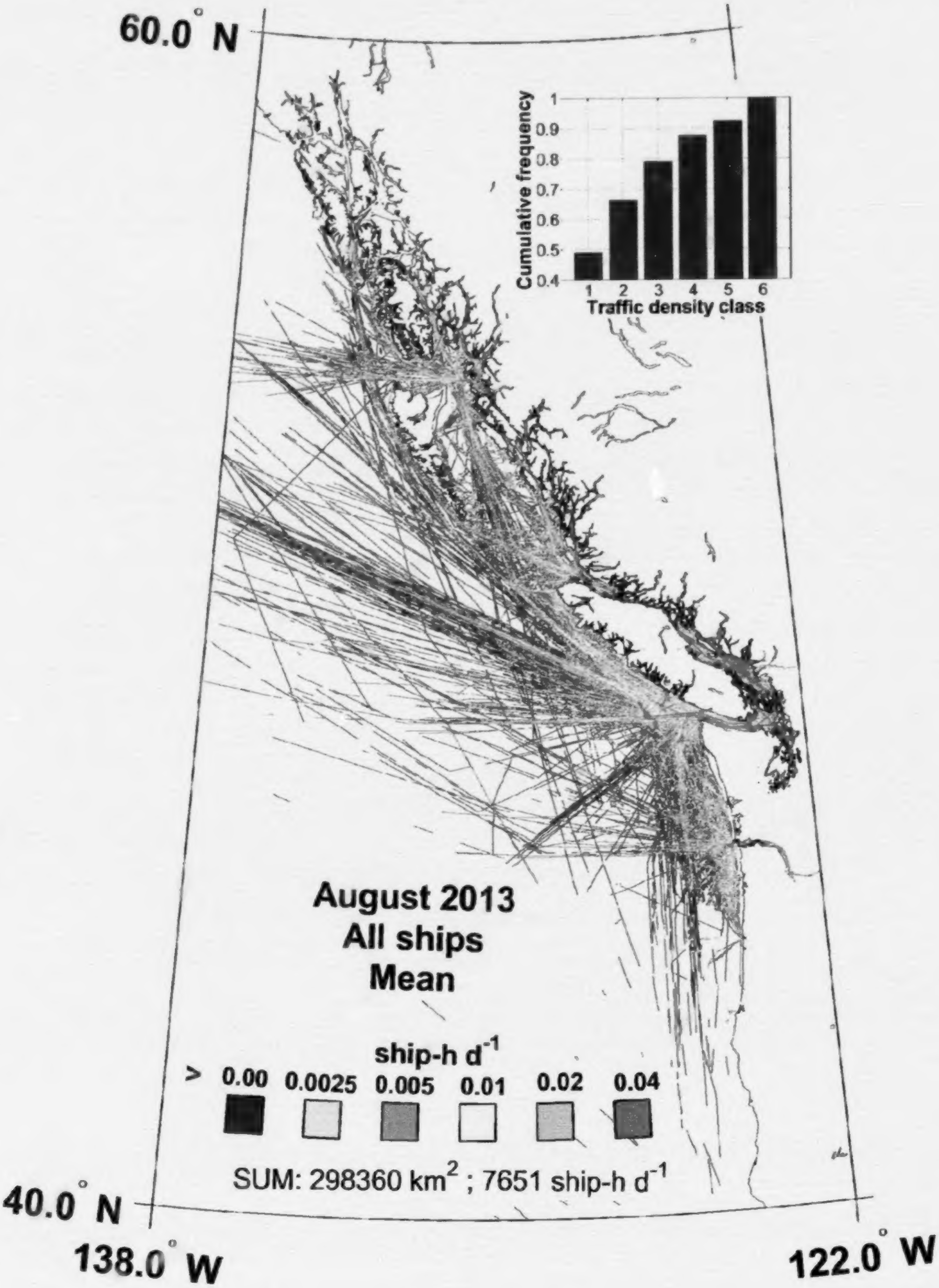

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
August 2013
All ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 298360 km^2 ; 7651 ship-h d^{-1}

Figure 187. Map of AIS mean traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

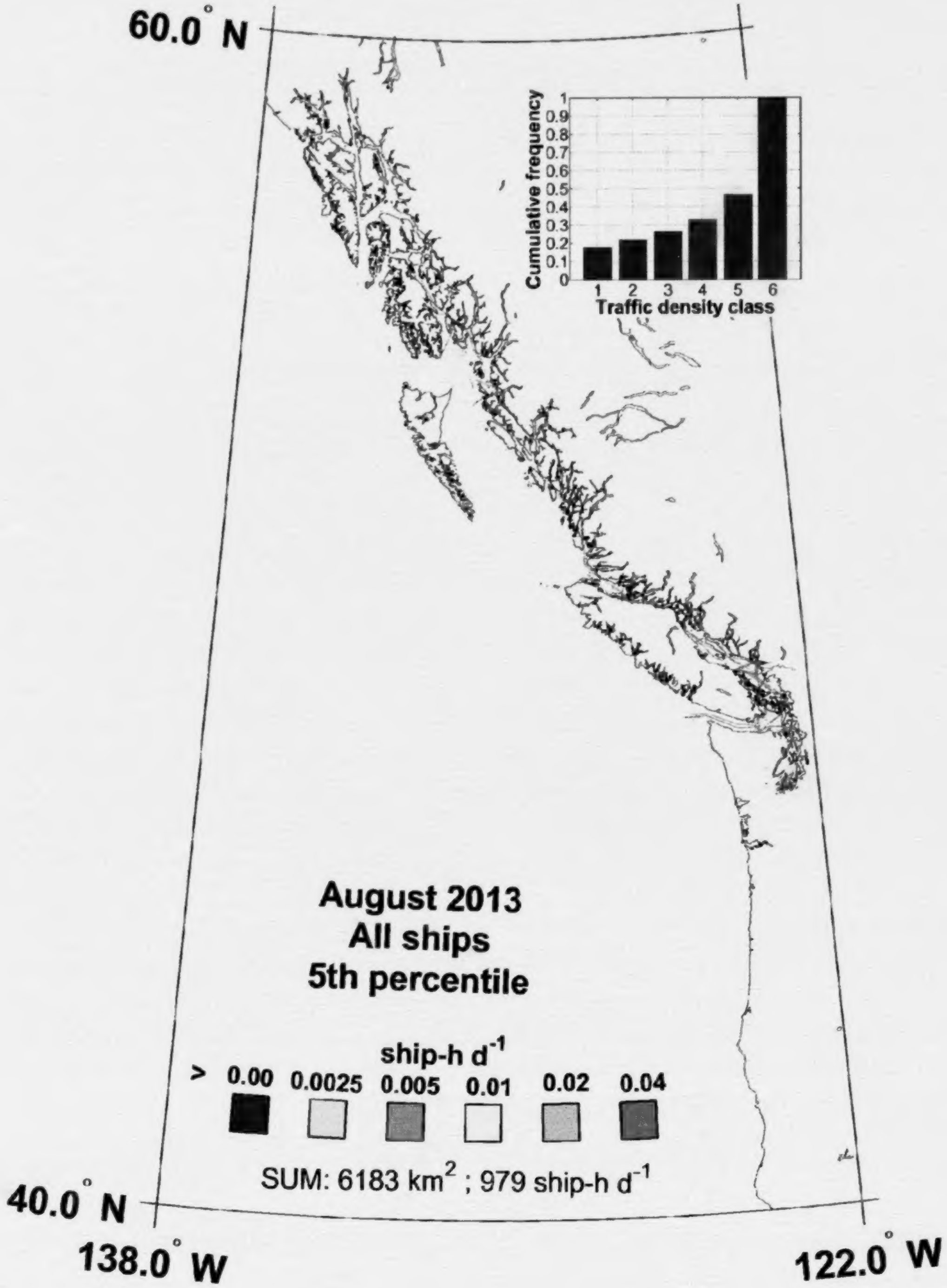

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
August 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 6183 km^2 ; 979 ship-h d^{-1}

Figure 188. Map of the 5th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

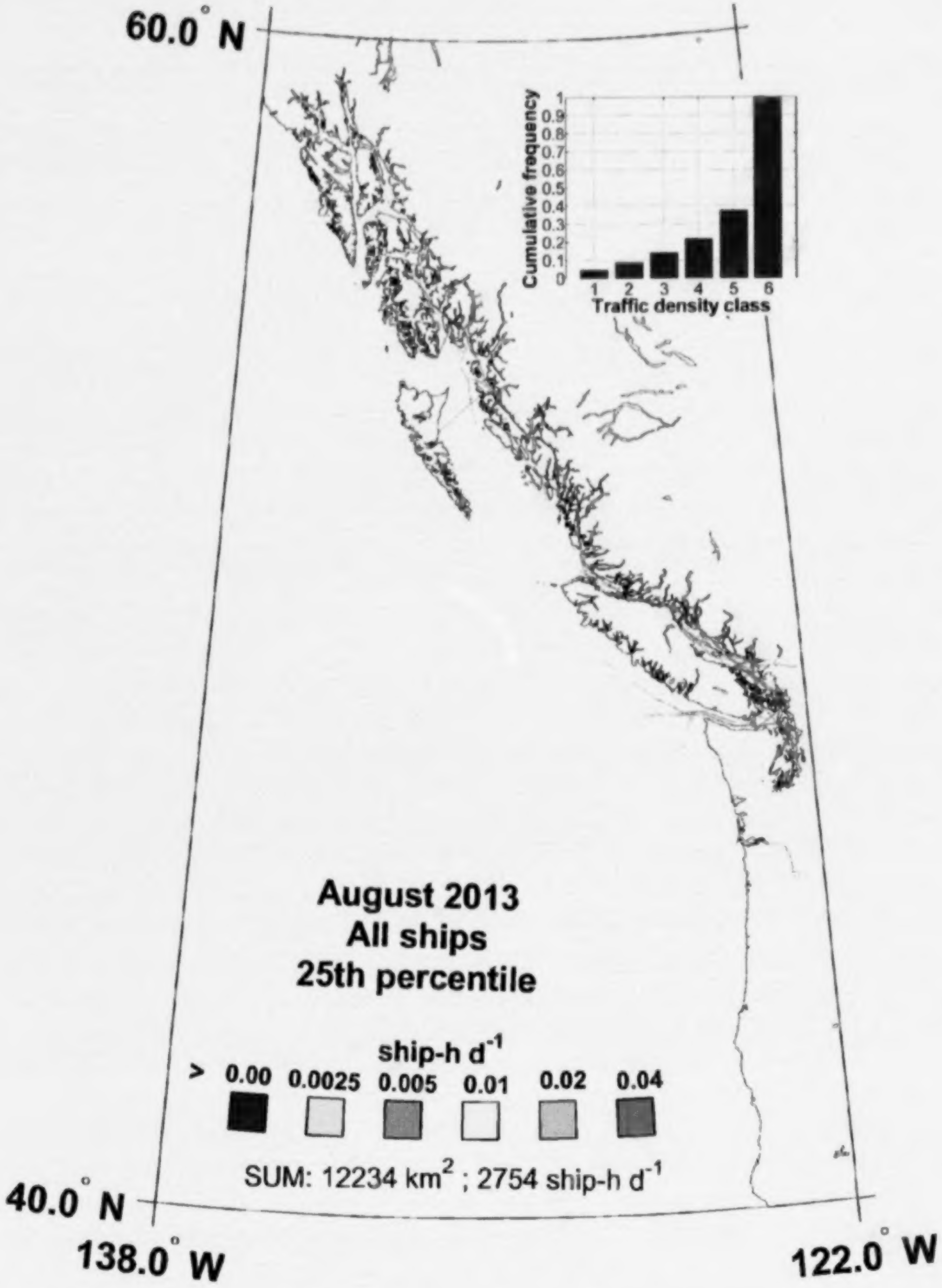

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
August 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 12234 km^2 ; 2754 ship-h d^{-1}

Figure 189. Map of the 25th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

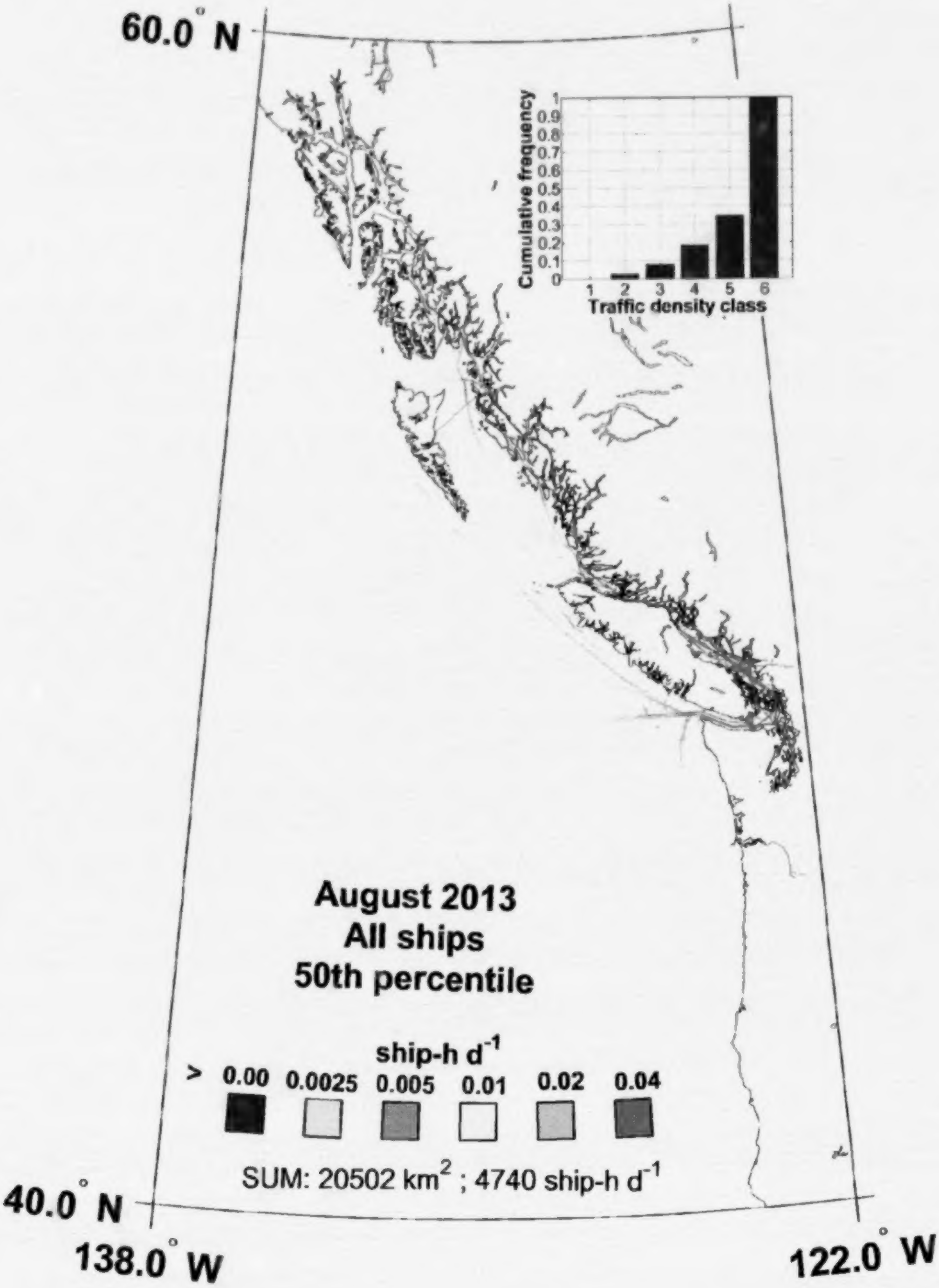

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
August 2013
All ships
50th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 20502 km^2 ; 4740 ship-h d^{-1}

Figure 190. Map of the 50th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

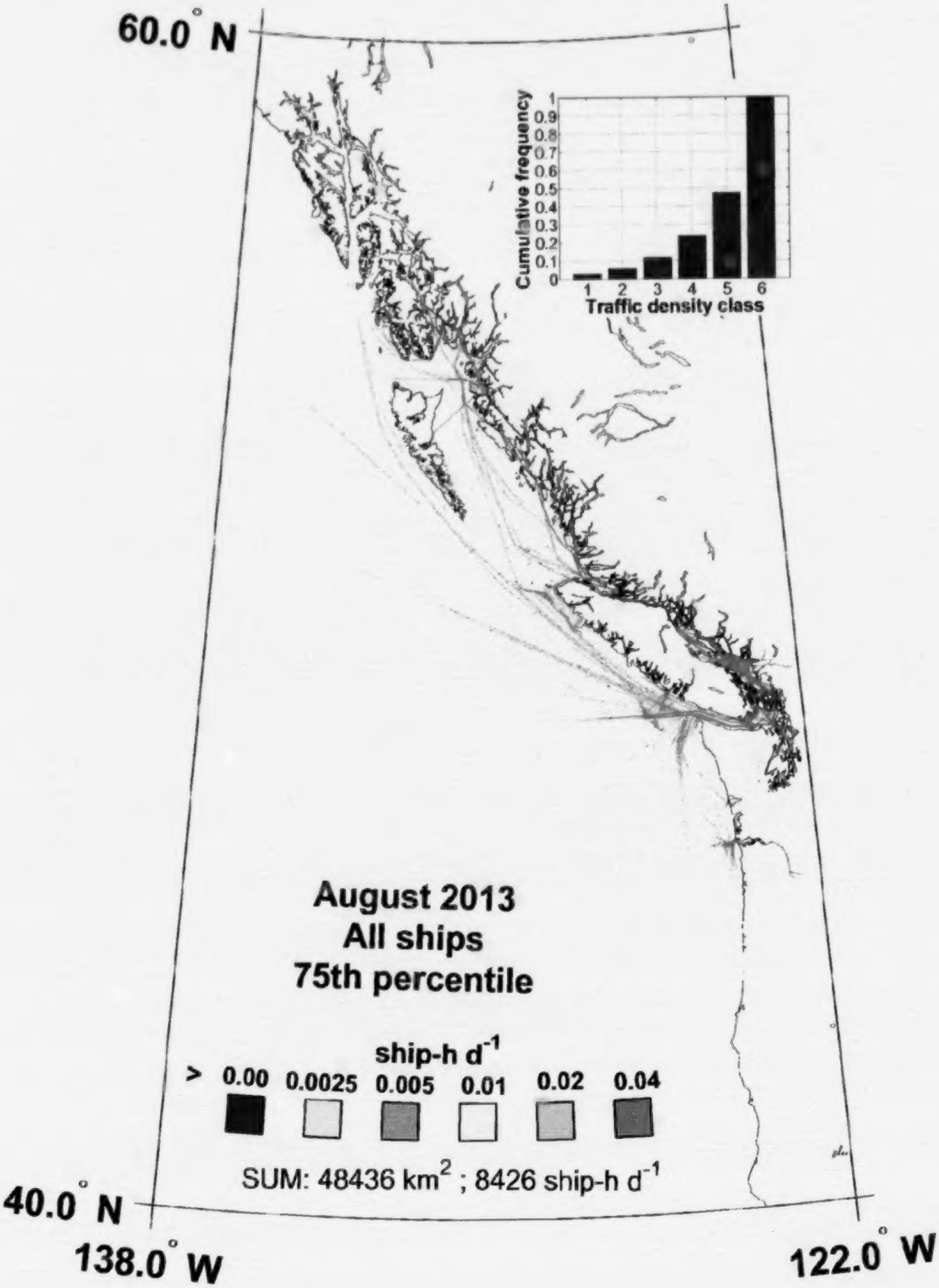

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
August 2013
All ships
75th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 48436 km² ; 8426 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 191. Map of the 75th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

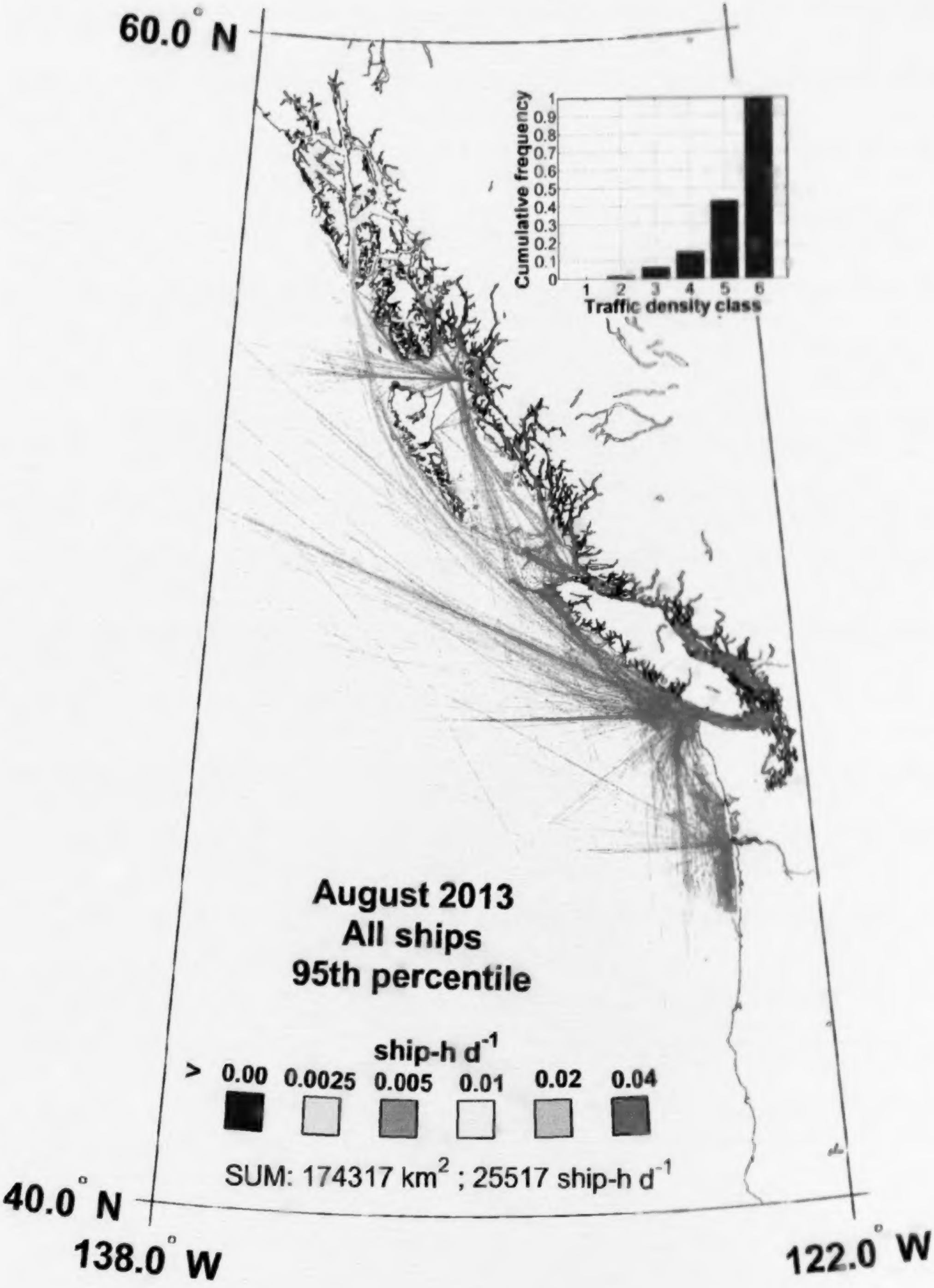

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
August 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 174317 km^2 ; 25517 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 192. Map of the 95th percentile of the daily AIS traffic density of all ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

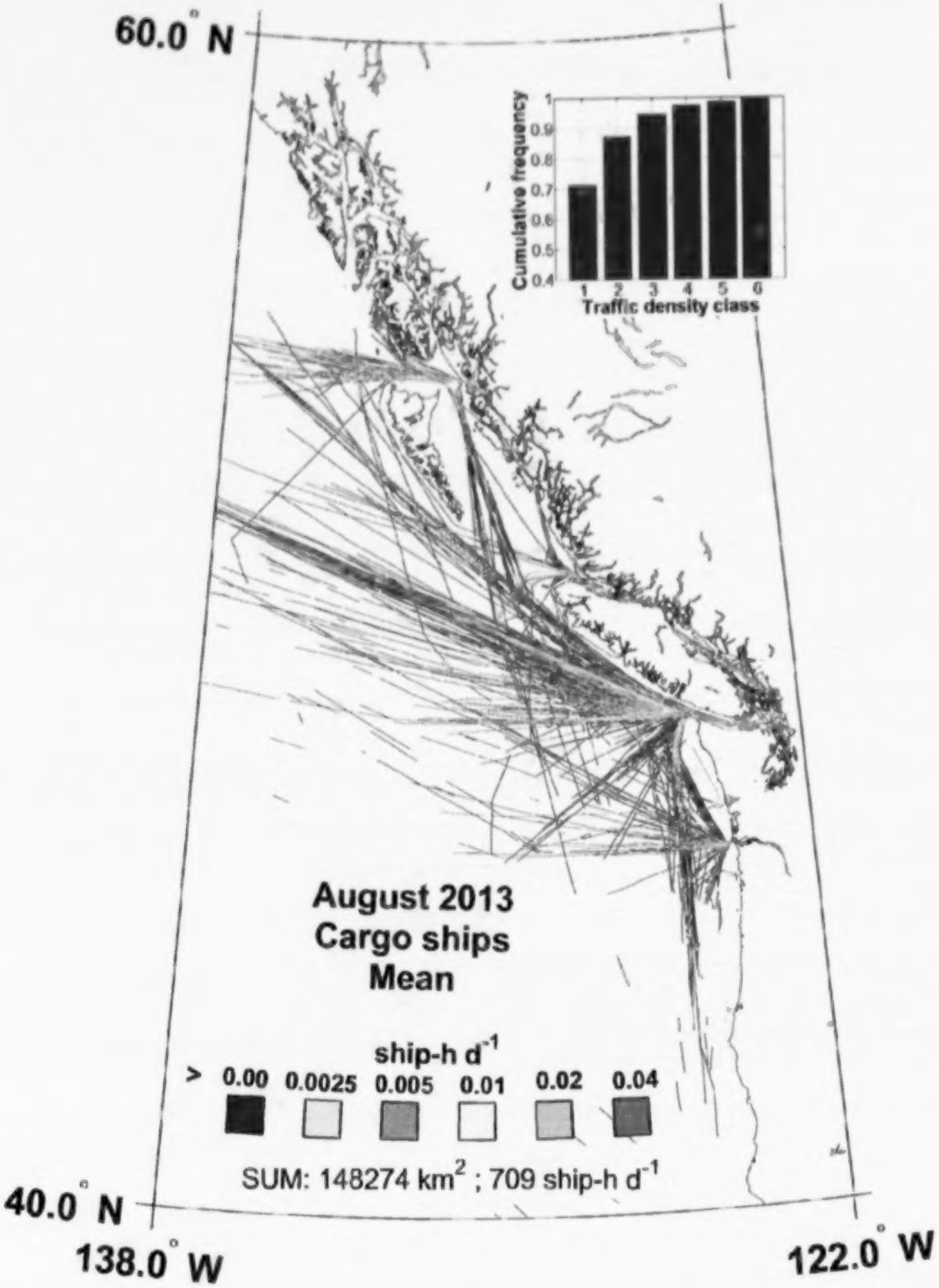

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
August 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 148274 km^2 ; 709 ship-h d^{-1}

Figure 193. Map of AIS mean traffic density of cargo-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

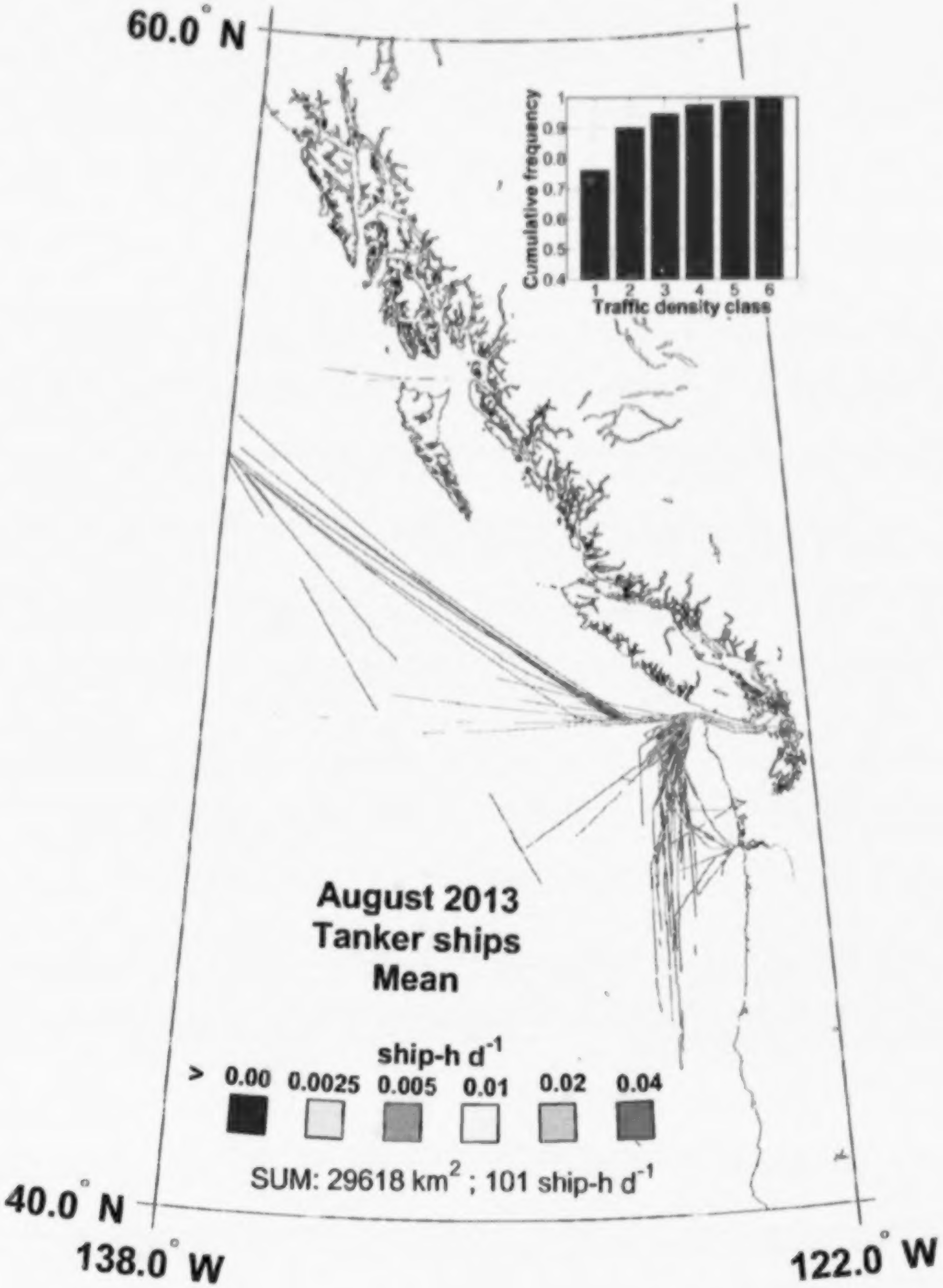

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
August 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 29618 km^2 ; 101 ship-h d^{-1}

Figure 194. Map of AIS mean traffic density of tanker-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

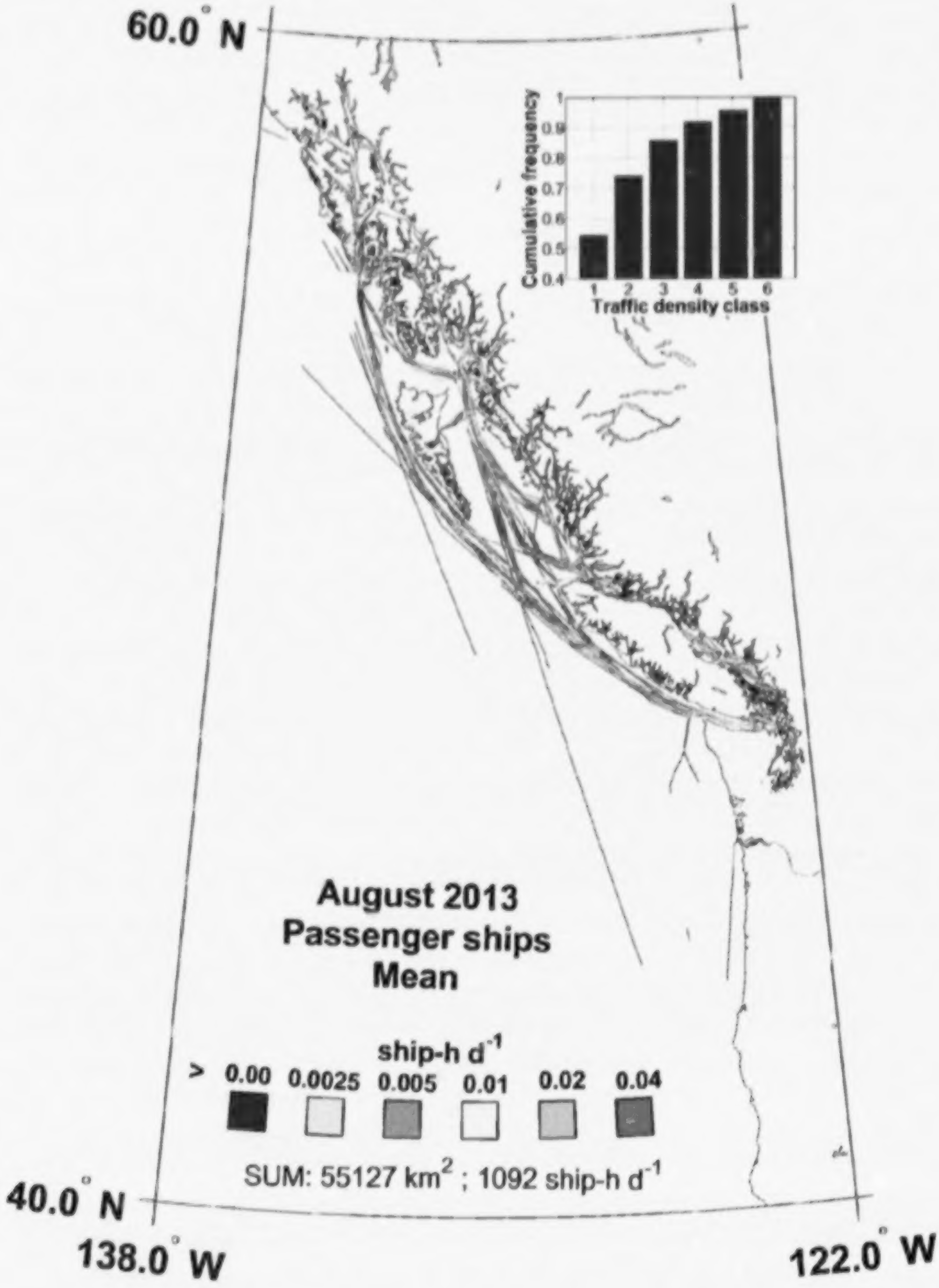

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 55127 km^2 ; 1092 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 195. Map of AIS mean traffic density of passenger-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

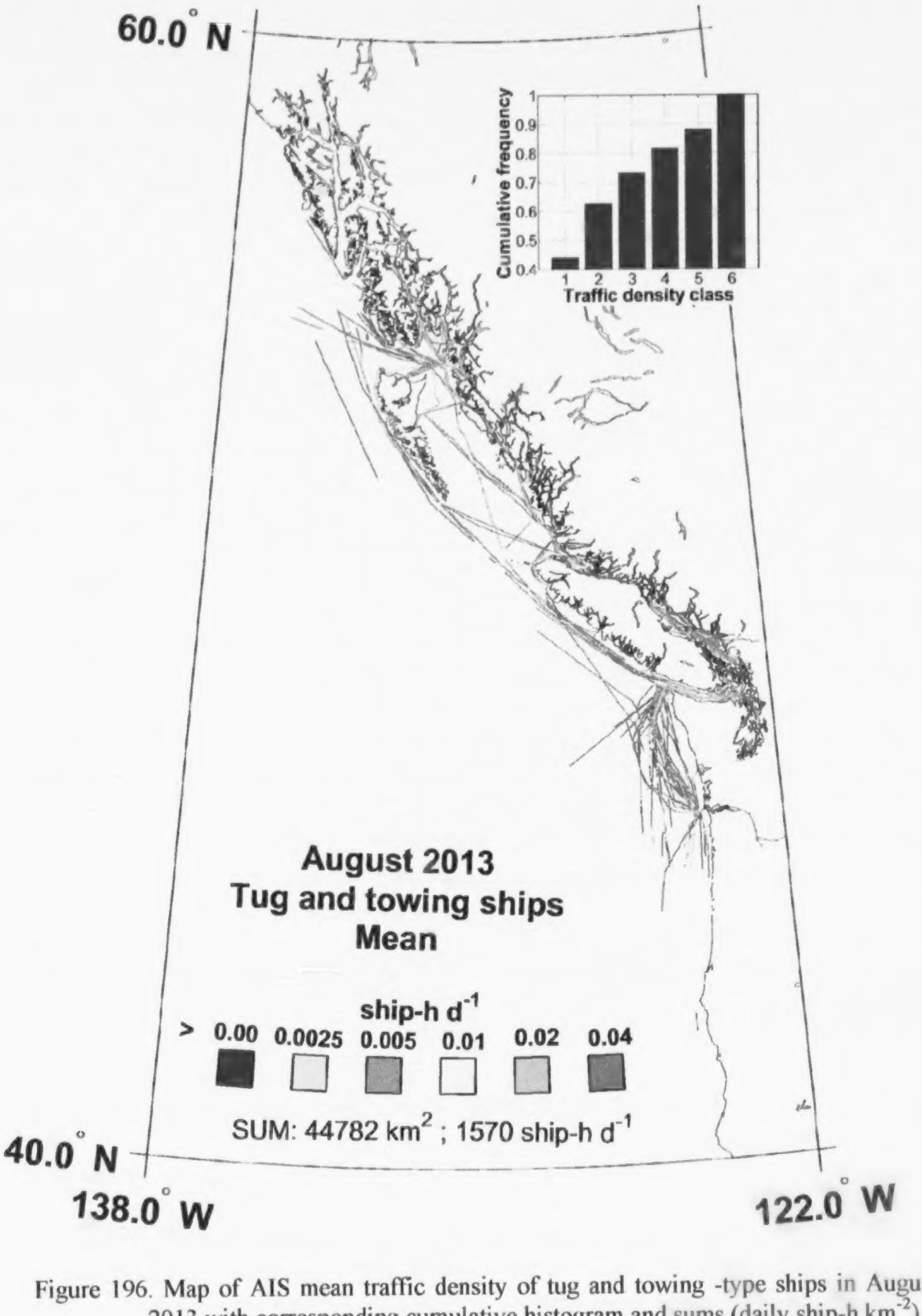

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
August 2013
Tug and towing ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 44782 km² ; 1570 ship-h d⁻¹

Figure 196. Map of AIS mean traffic density of tug and towing -type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

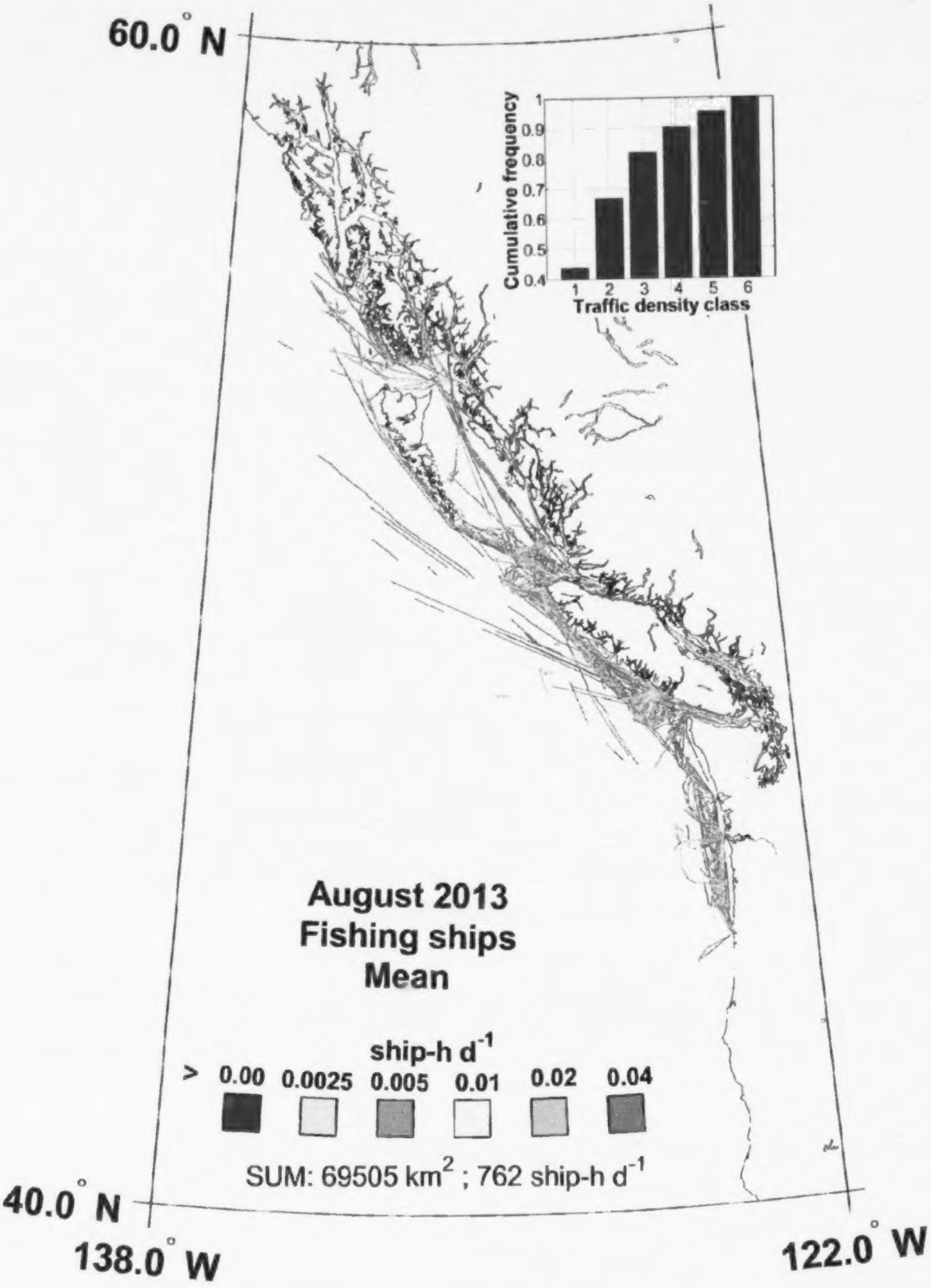

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 69505 km^2 ; 762 ship-h d^{-1}

Figure 197. Map of AIS mean traffic density of fishing-type ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

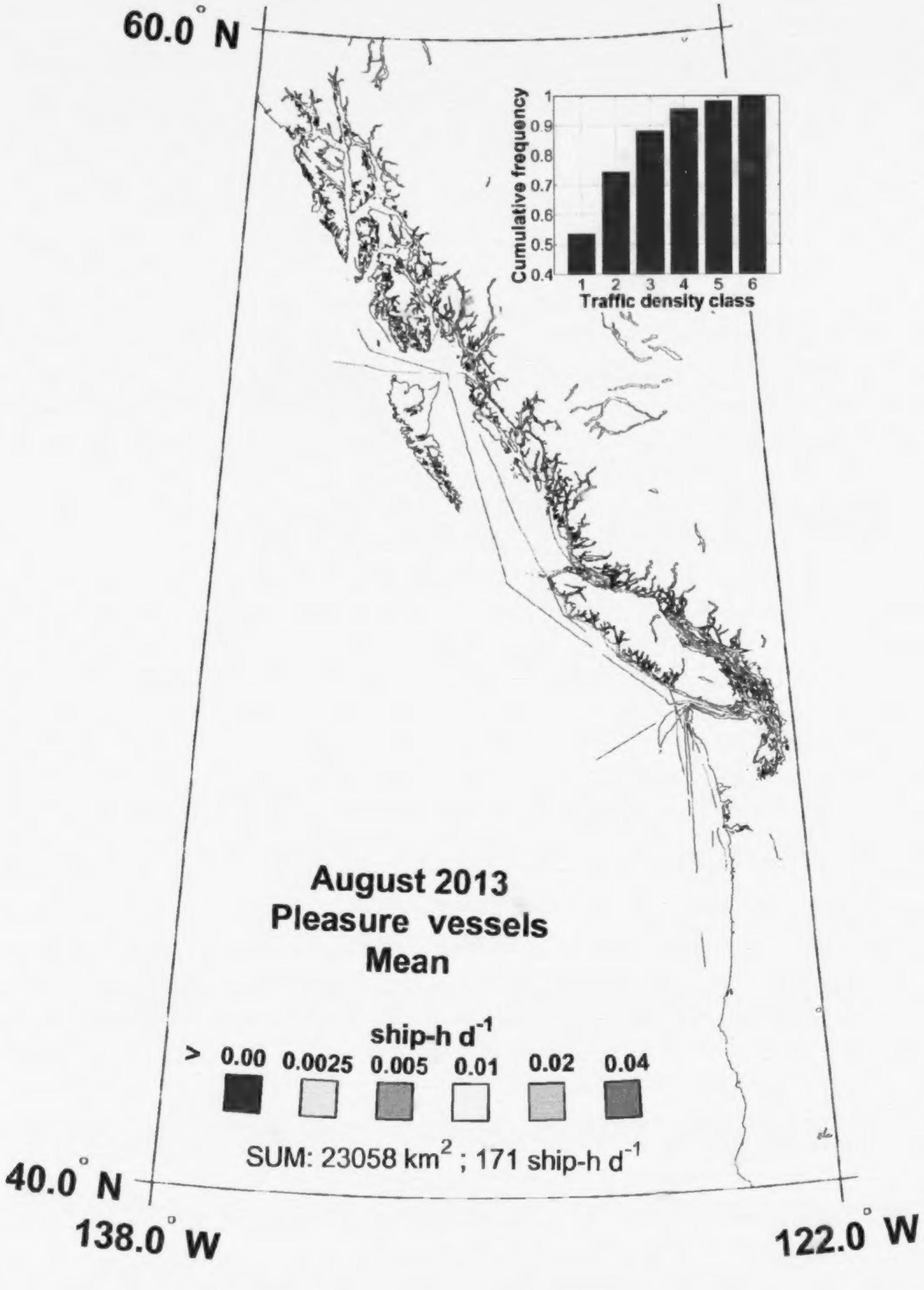

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 23058 km^2 ; 171 ship-h d^{-1}

Figure 198. Map of AIS mean traffic density of pleasure-type vessels in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

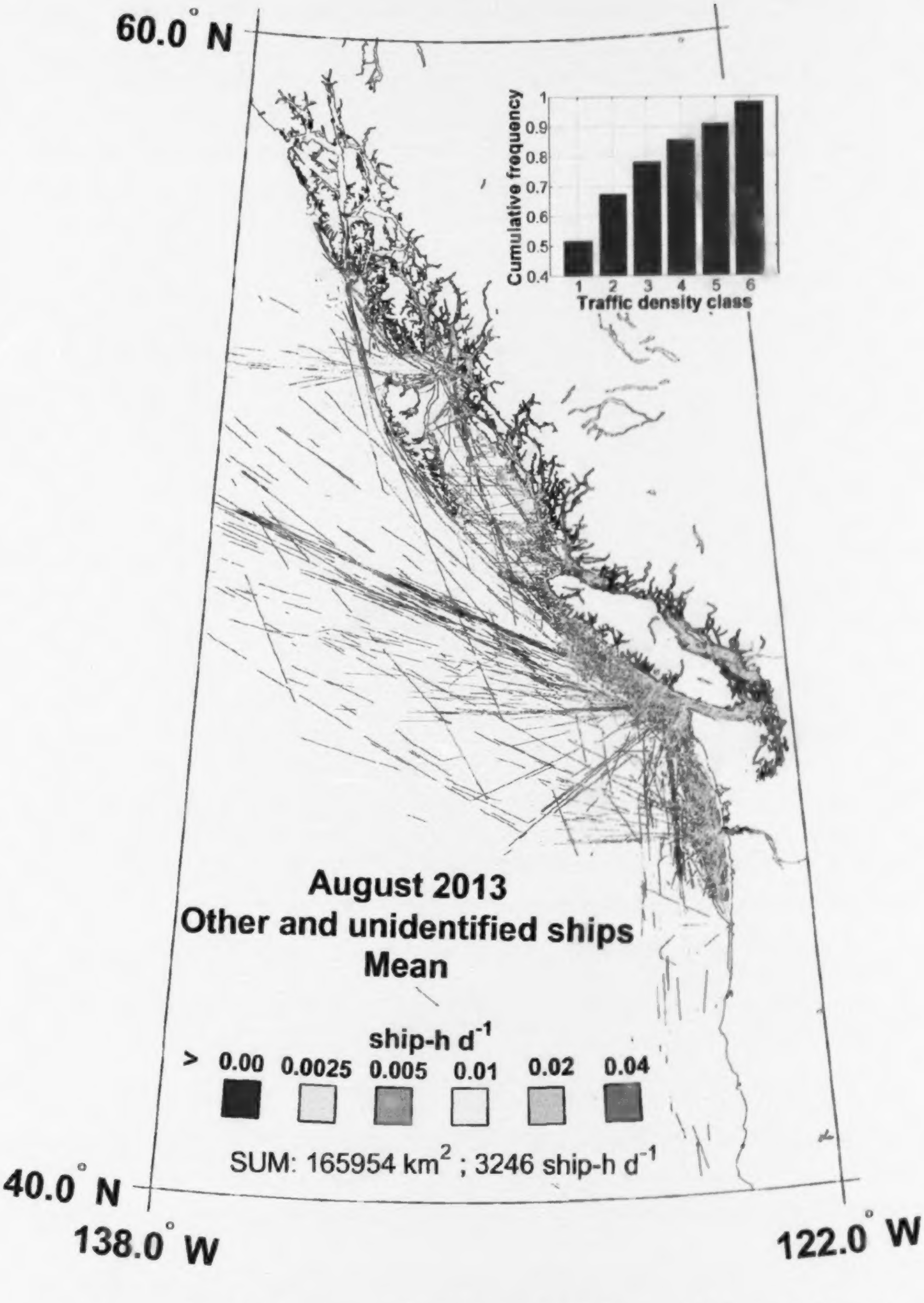

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
August 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 165954 km^2 ; 3246 ship-h d^{-1}

Figure 199. Map of AIS mean traffic density of other type of ships and ships of unidentified type in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

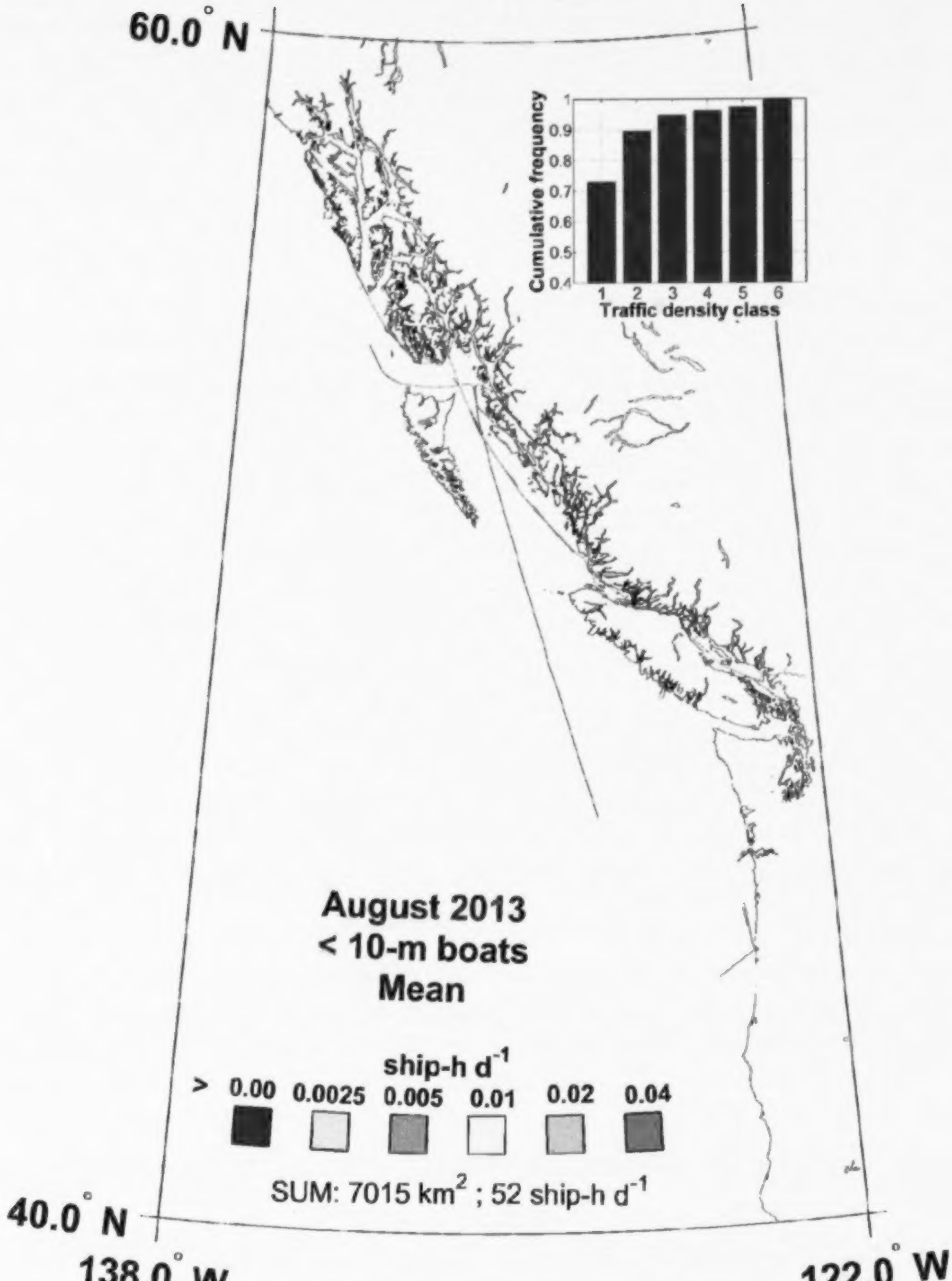

60.0° N
1
0.9
0.8
0.7
0.6
0.5
0.4
Cumulative frequency
1 2 3 4 5 6
Traffic density class
August 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 7015 km^2 ; 52 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 200. Map of AIS mean traffic density of ships with lengths < 10 min August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

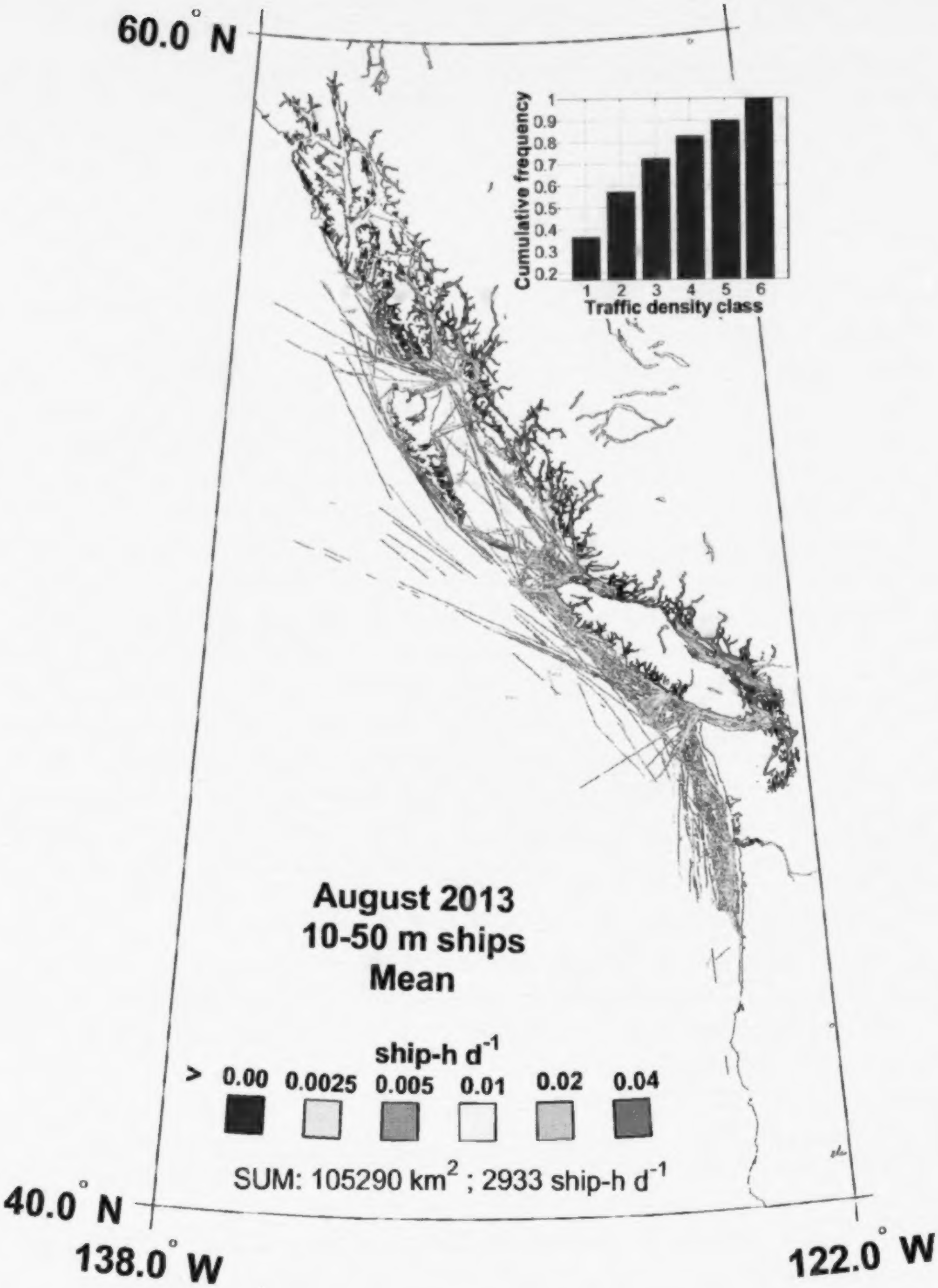

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
August 2013
10-50 m ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 105290 km^2 ; 2933 ship-h d^{-1}

Figure 201. Map of AIS mean traffic density of 10 to 50 m ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

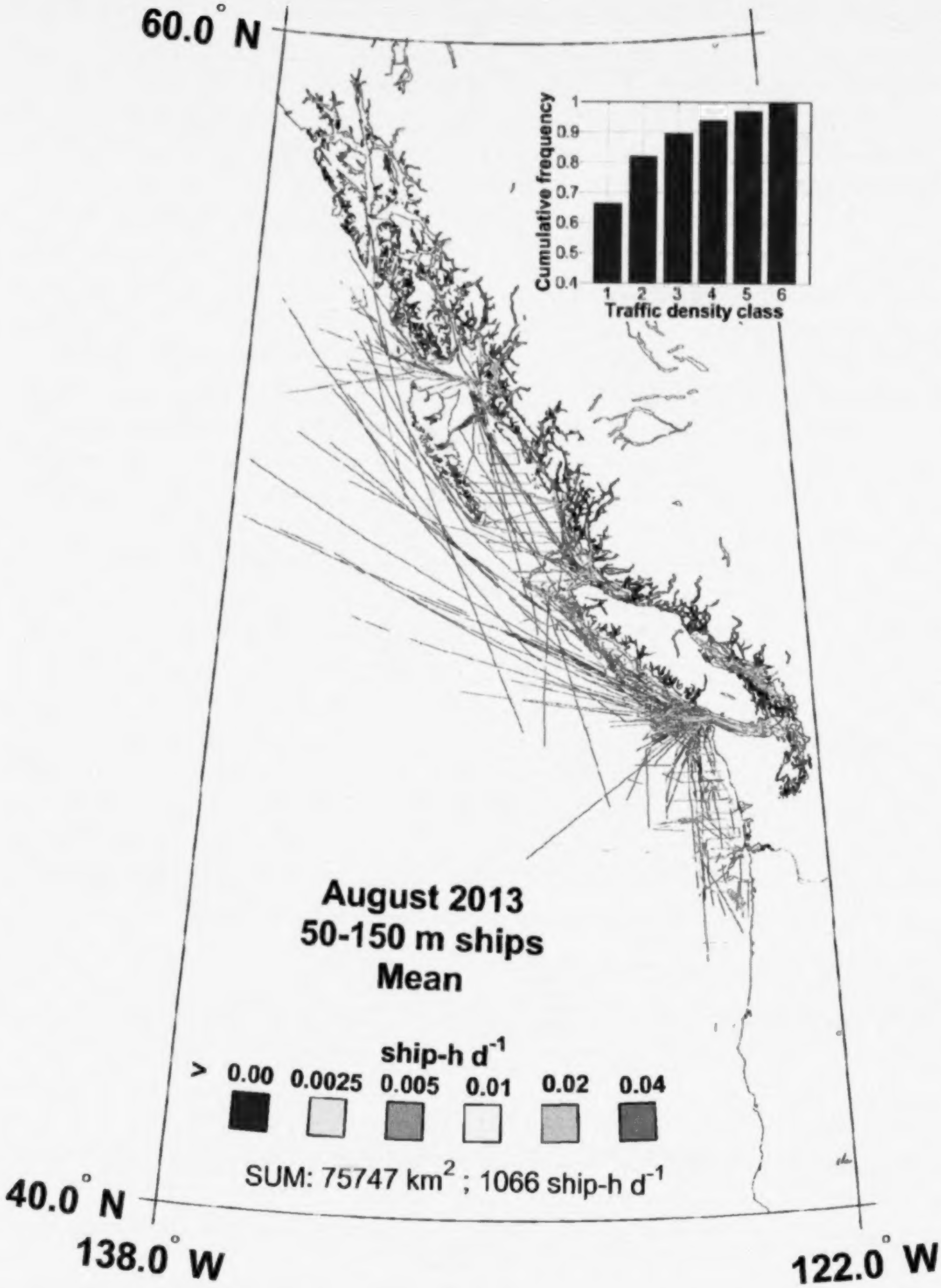

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
50-150 m ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 75747 km^2 ; 1066 ship-h d^{-1}

Figure 202. Map of AIS mean traffic density of 50 to 150 m ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

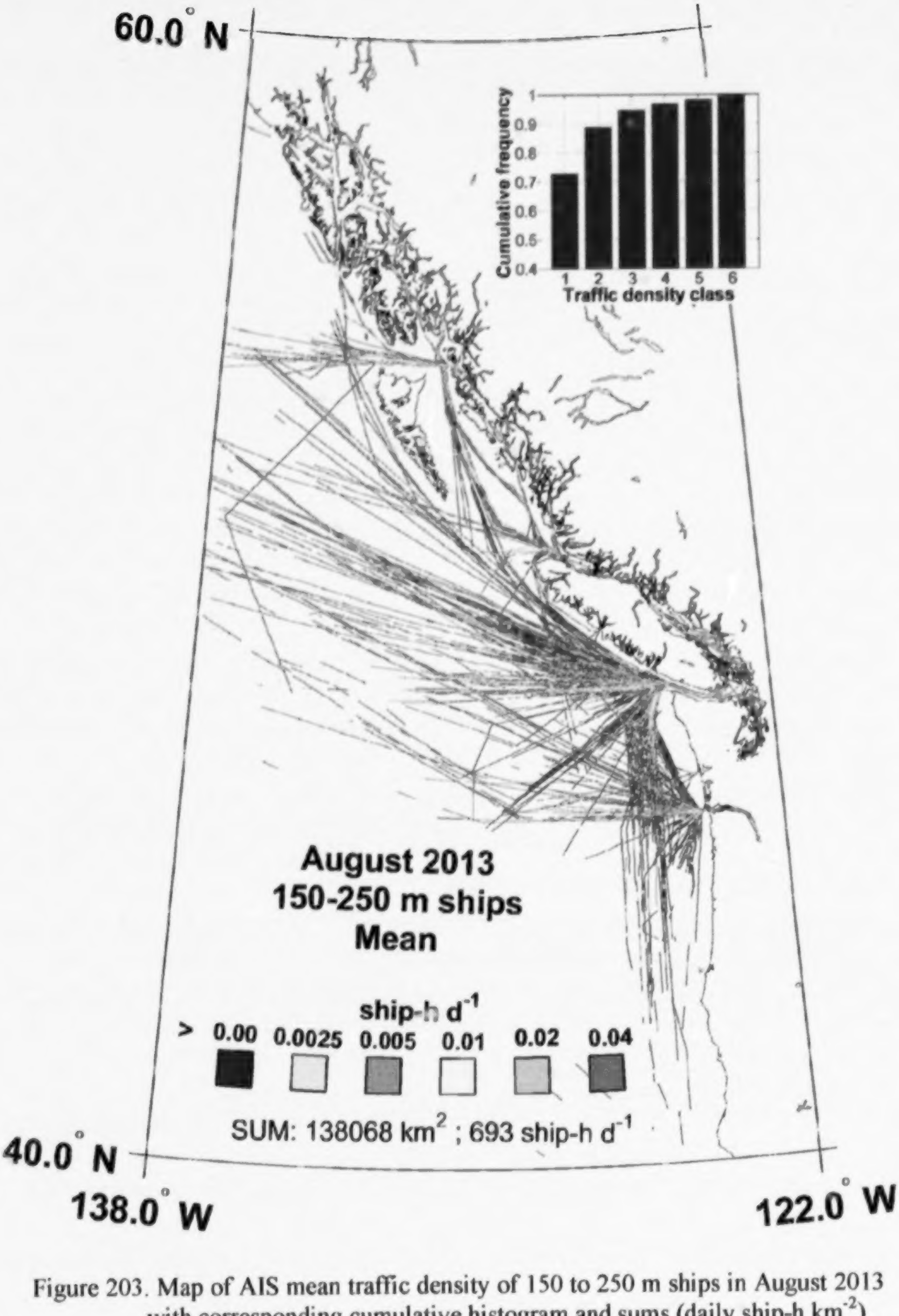

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 138068 km^2 ; 693 ship-h d^{-1}

Figure 203. Map of AIS mean traffic density of 150 to 250 m ships in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

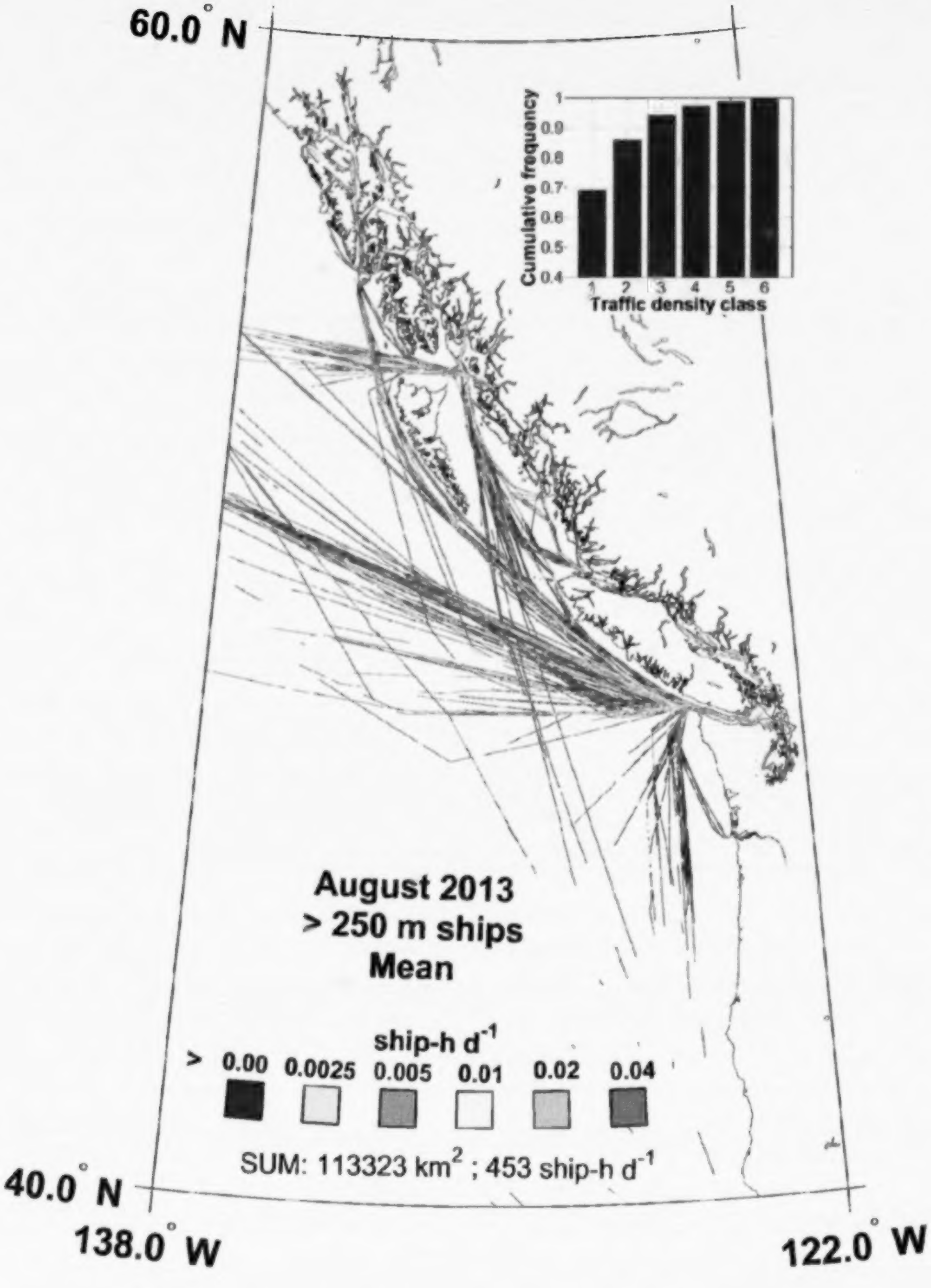

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 113323 km^2 ; 453 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 204. Map of >250 m ship AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

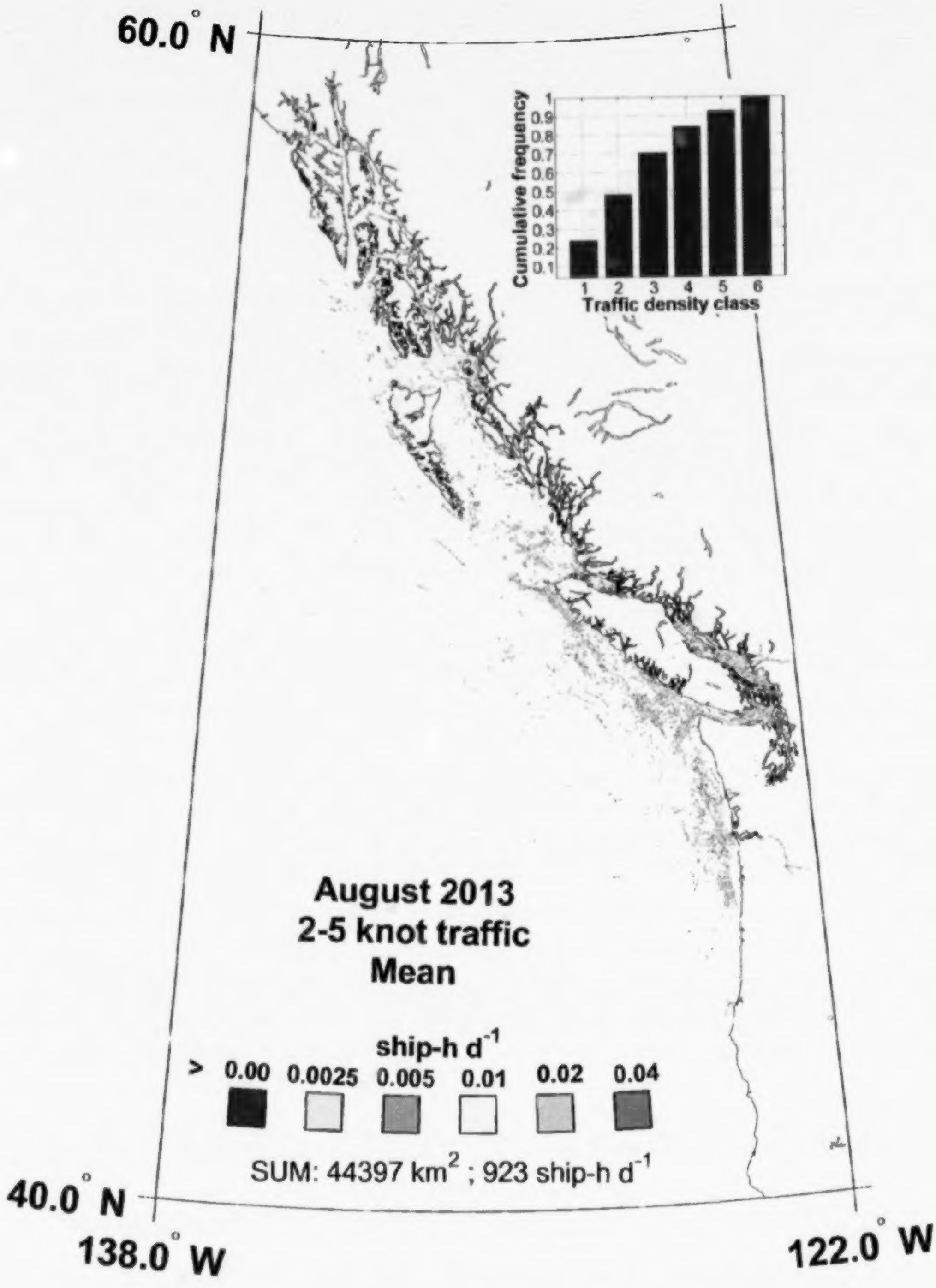

60.0° N
Cumulative frequency
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
August 2013
2-5 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 44397 km2 ; 923 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 205. Map of 2–5 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

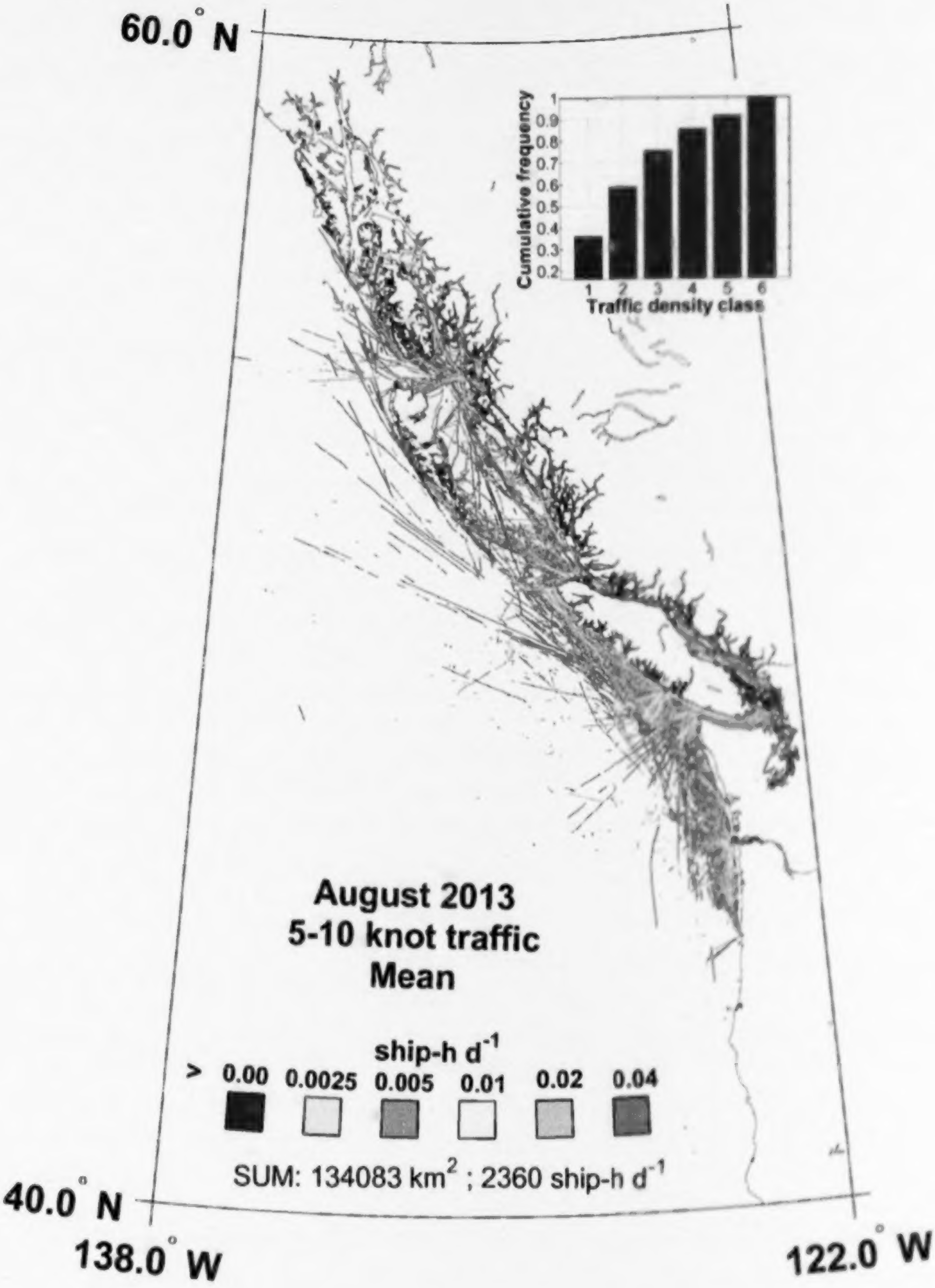

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
August 2013
5-10 knot traffic
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 134083 km² ; 2360 ship-h d⁻¹

Figure 206. Map of 5–10 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

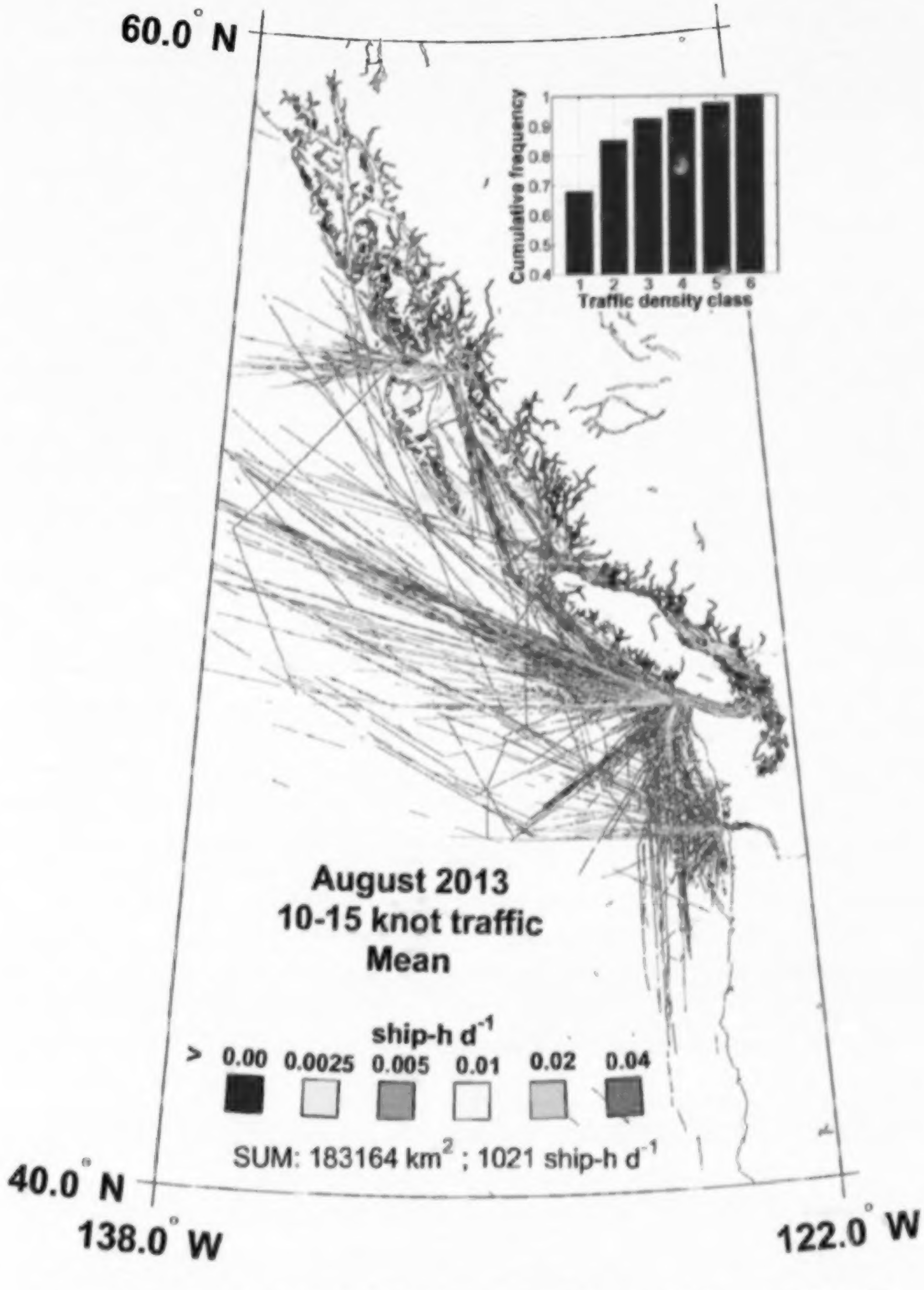

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
10-15 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 183164 km² ; 1021 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 207. Map of 10–15 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

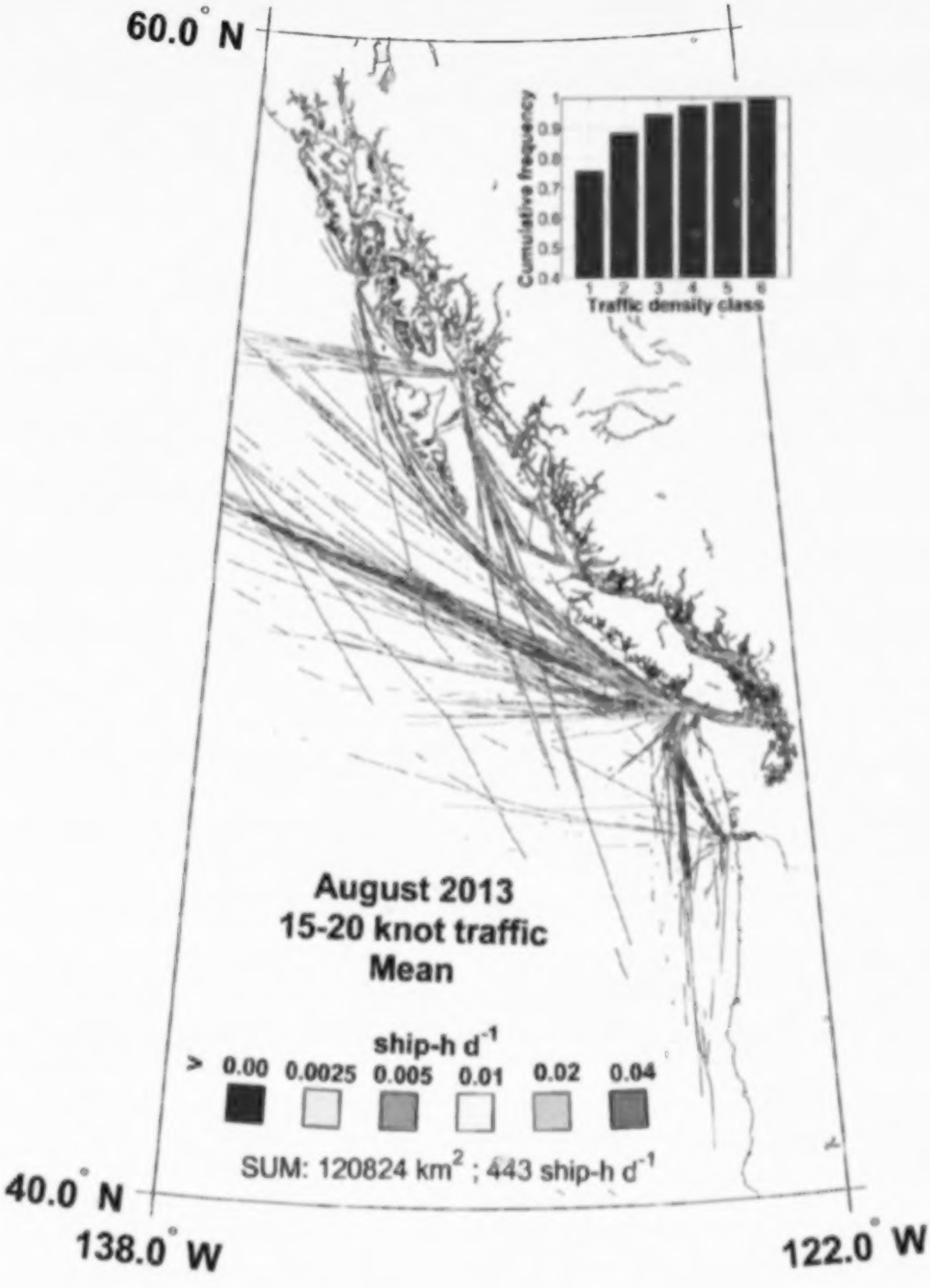

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
15-20 knot traffic
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 120824 km2 ; 443 ship-h d-1

Figure 208. Map of 15–20 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

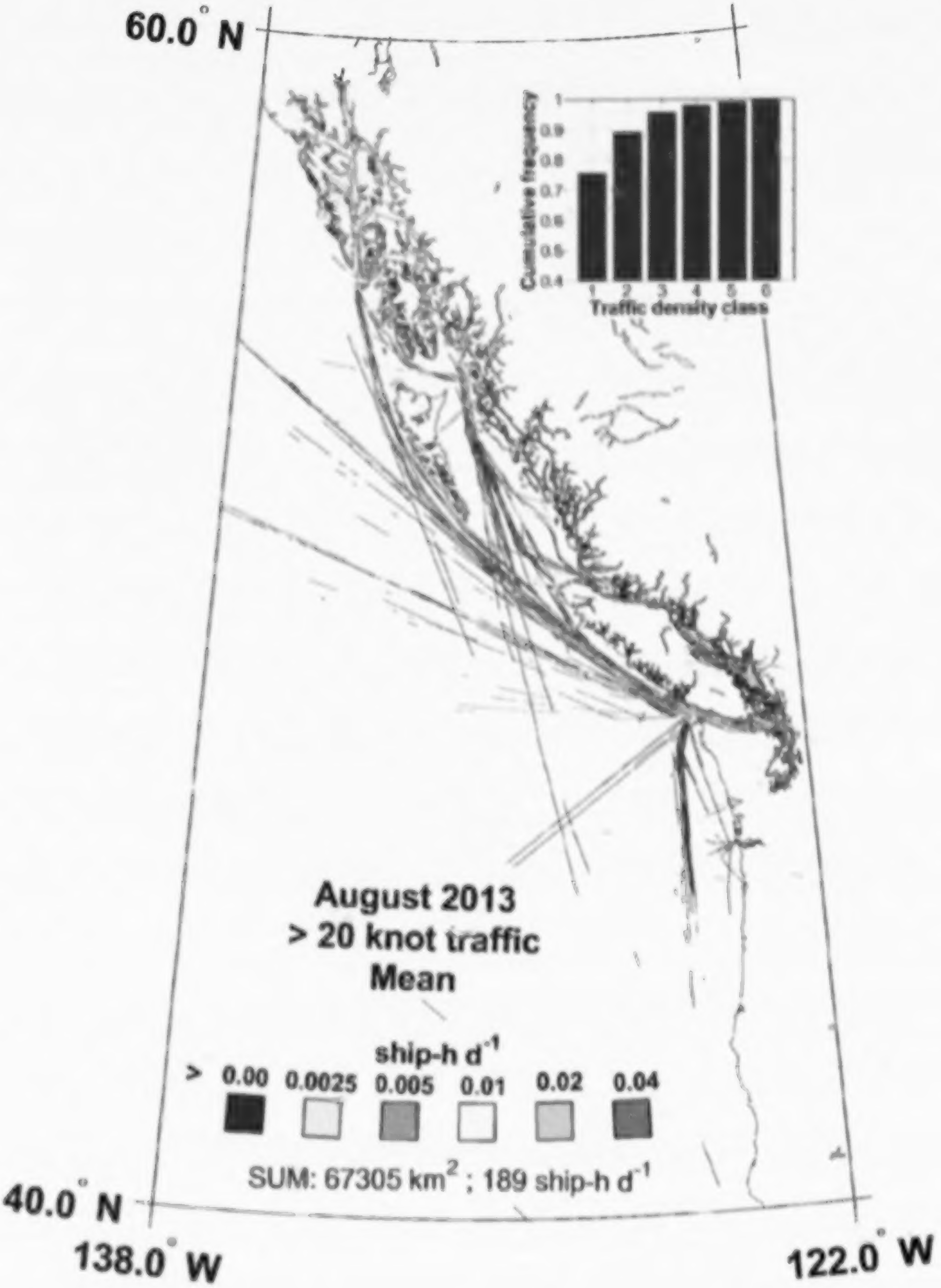

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
August 2013
> 20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 67305 km^2 ; 189 ship-h d^{-1}

Figure 209. Map of >20 knot AIS mean traffic density in August 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.9. September 2013

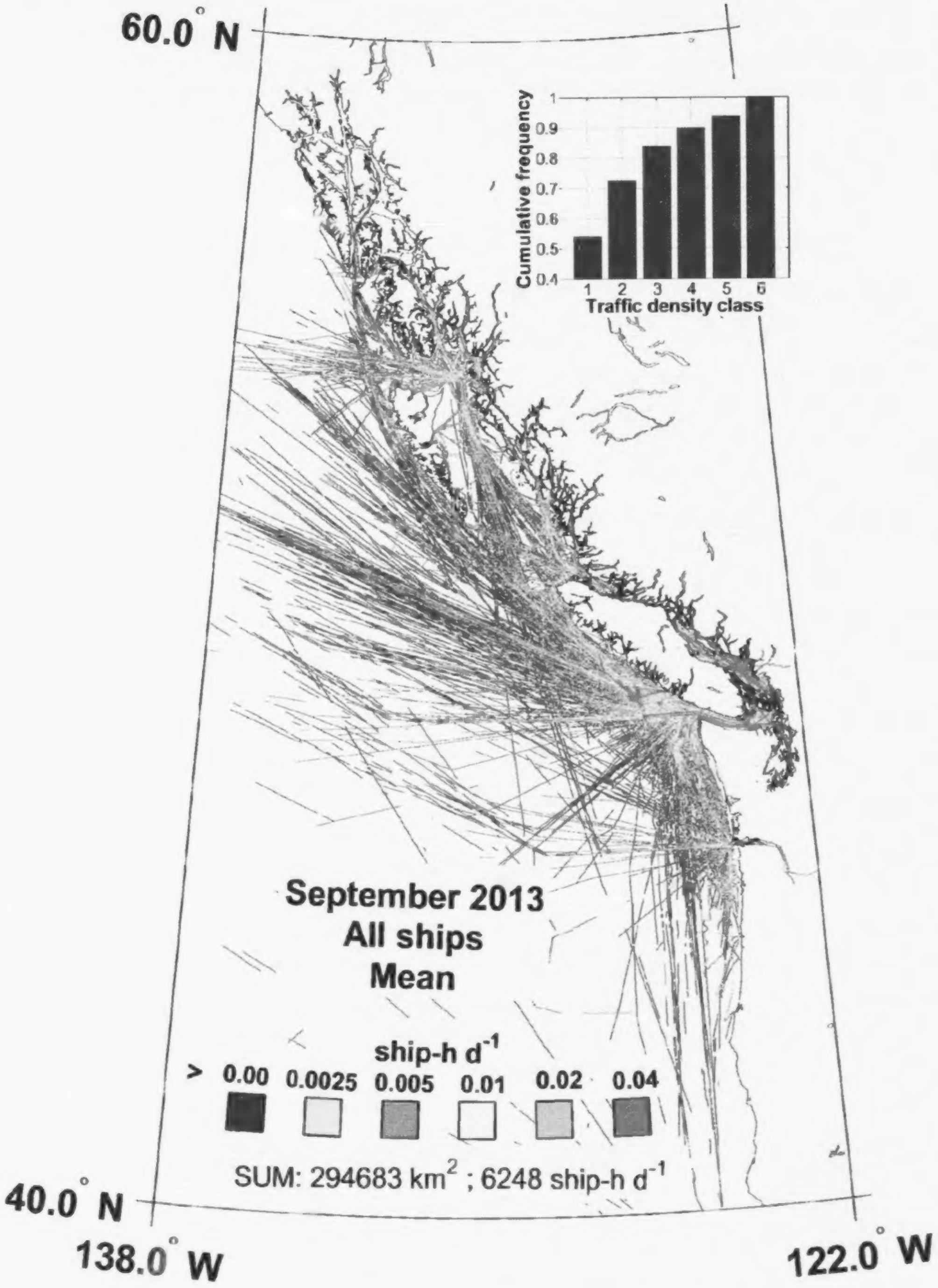

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
All ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 294683 km^2 ; 6248 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 210. Map of AIS mean traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

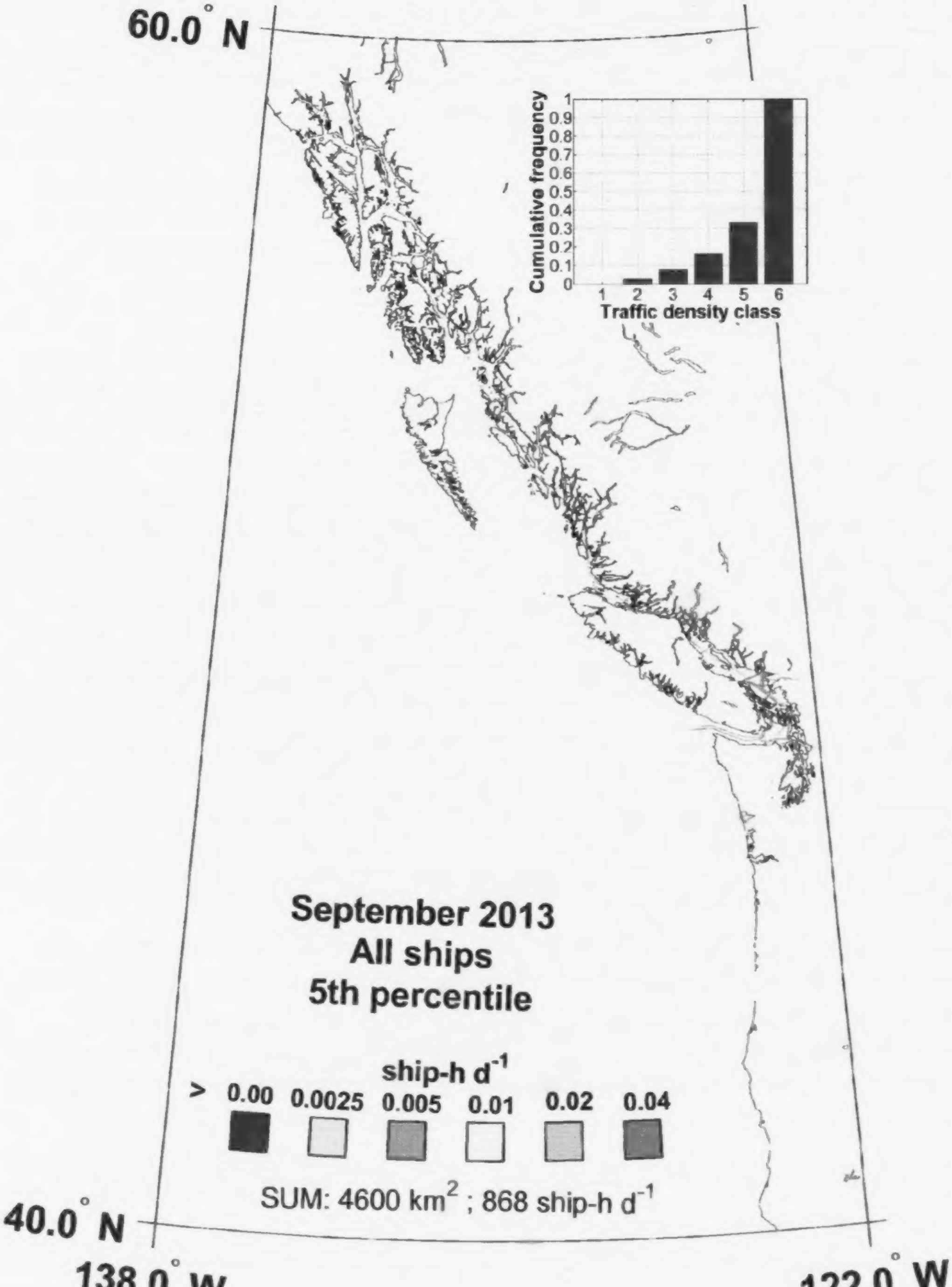

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
September 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 4600 km^2 ; 868 ship-h d^{-1}

Figure 211. Map of the 5th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

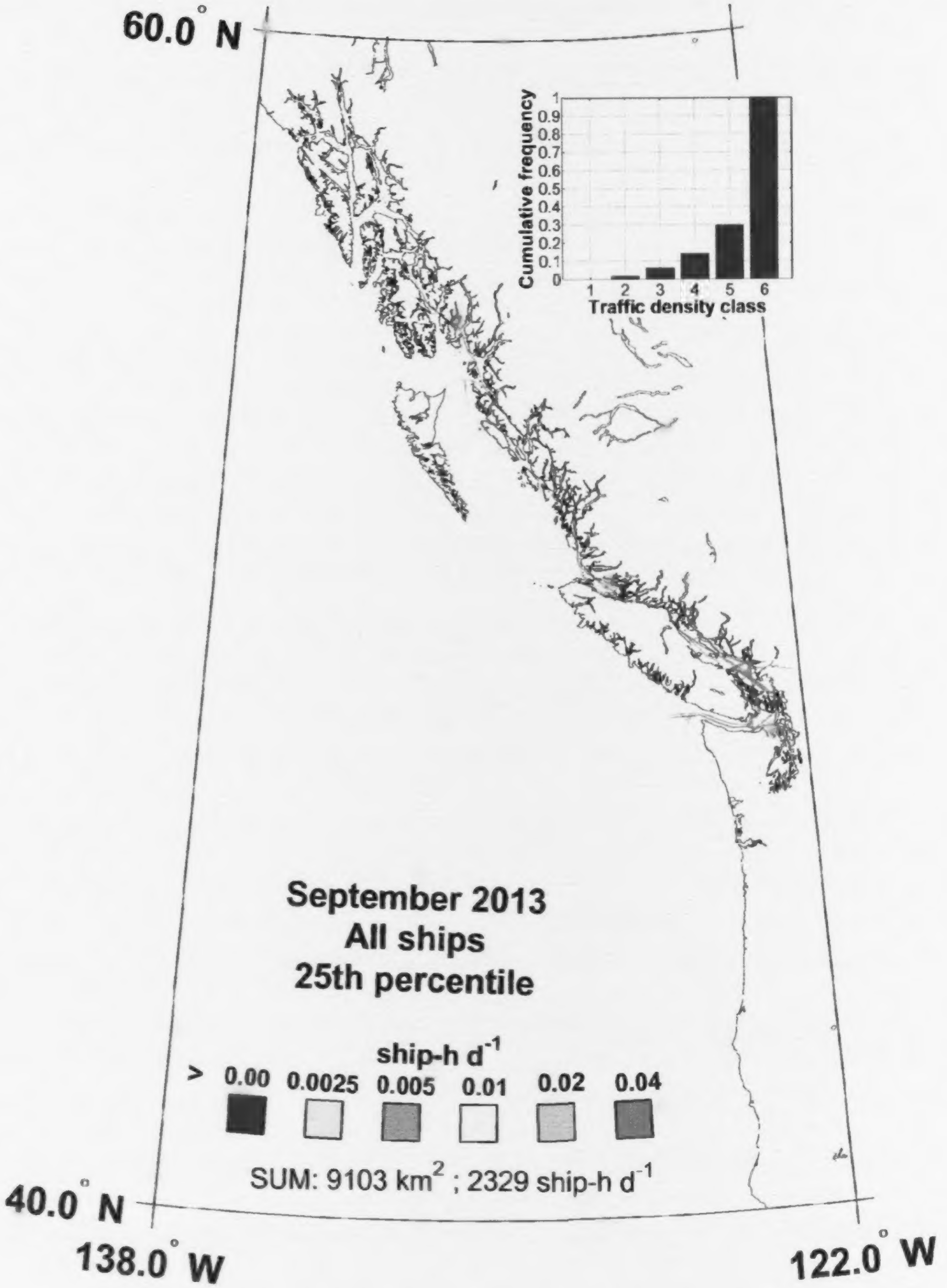

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
September 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 9103 km^2 ; 2329 ship-h d^{-1}

Figure 212. Map of the 25th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

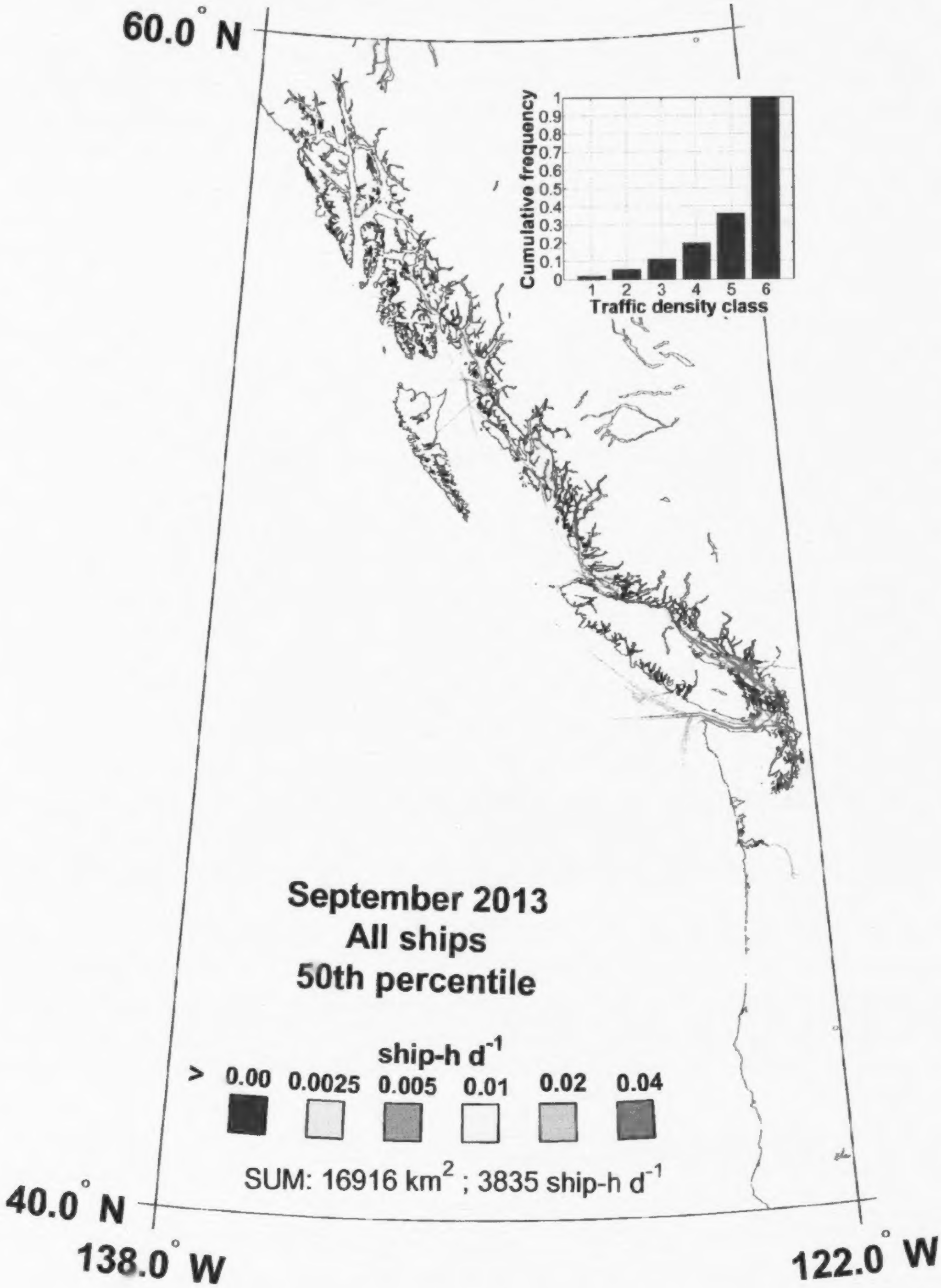

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
September 2013
All ships
50th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 16916 km^2 ; 3835 ship-h d^{-1}

Figure 213. Map of the 50th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

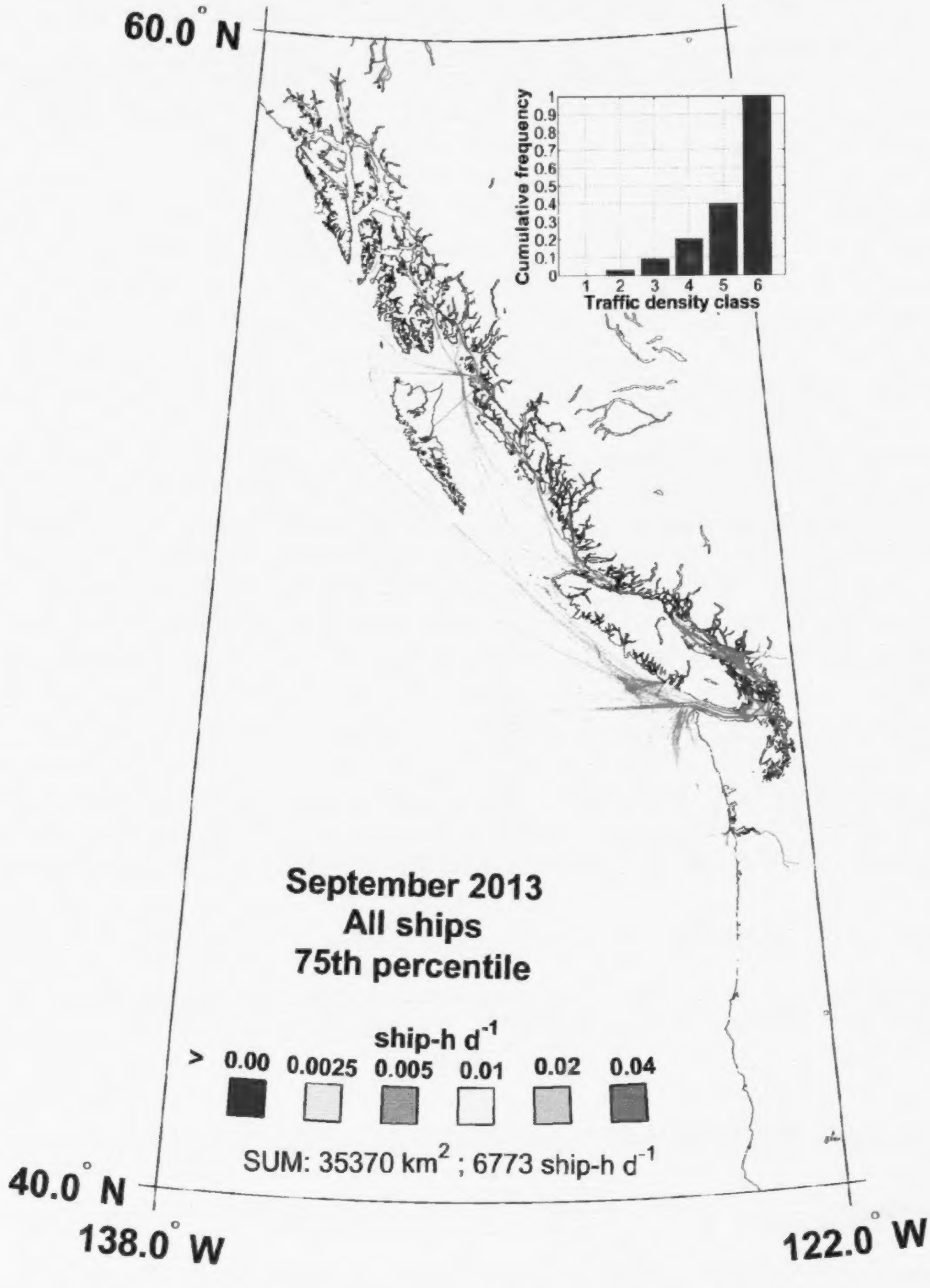

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
September 2013
All ships
75th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 35370 km^2 ; 6773 ship-h d^{-1}

Figure 214. Map of the 75th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

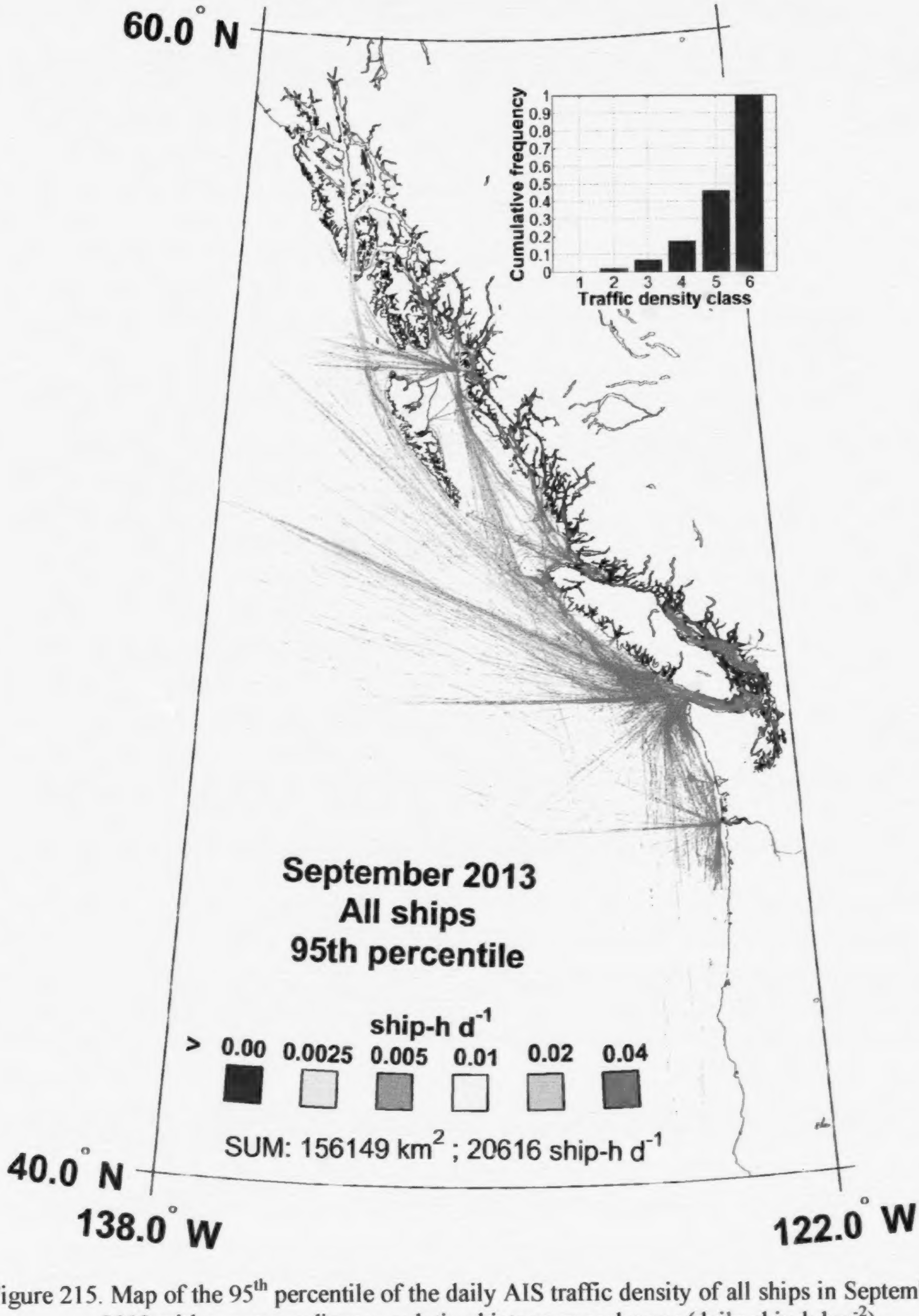

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
September 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 156149 km^2 ; 20616 ship-h d^{-1}

Figure 215. Map of the 95th percentile of the daily AIS traffic density of all ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

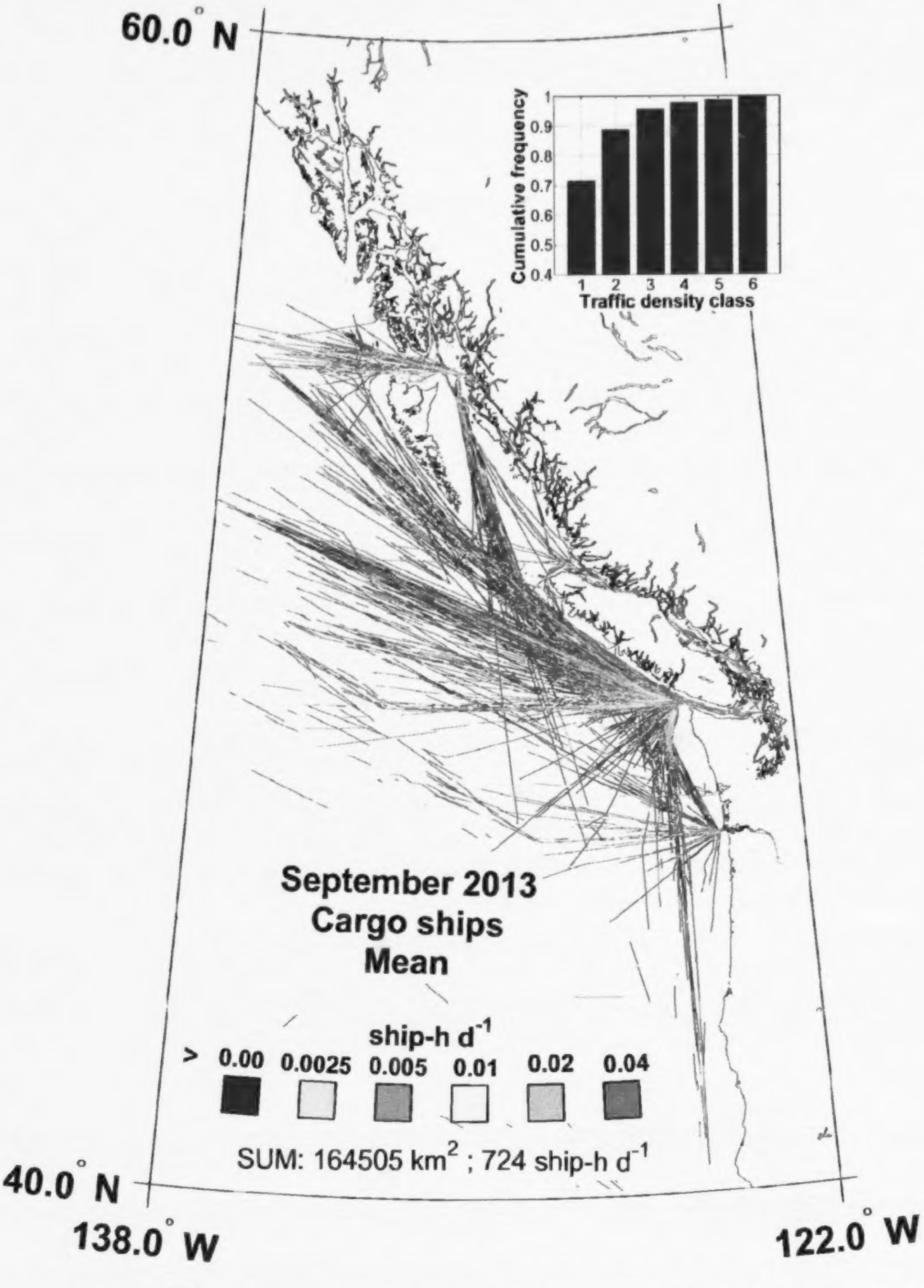

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 164505 km^2 ; 724 ship-h d^{-1}

Figure 216. Map of AIS mean traffic density of cargo-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

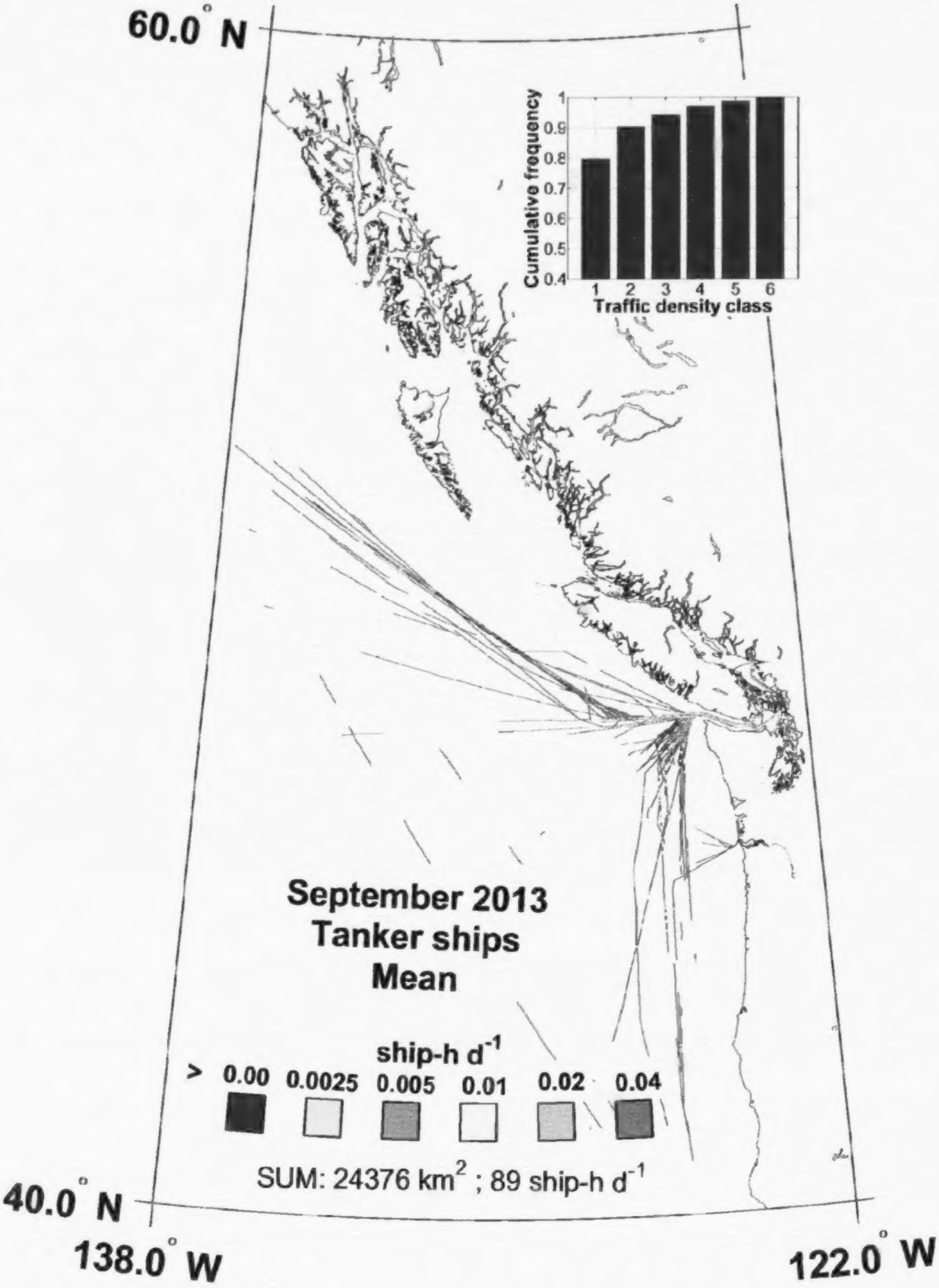

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 24376 km^2 ; 89 ship-h d^{-1}

Figure 217. Map of AIS mean traffic density of tanker-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

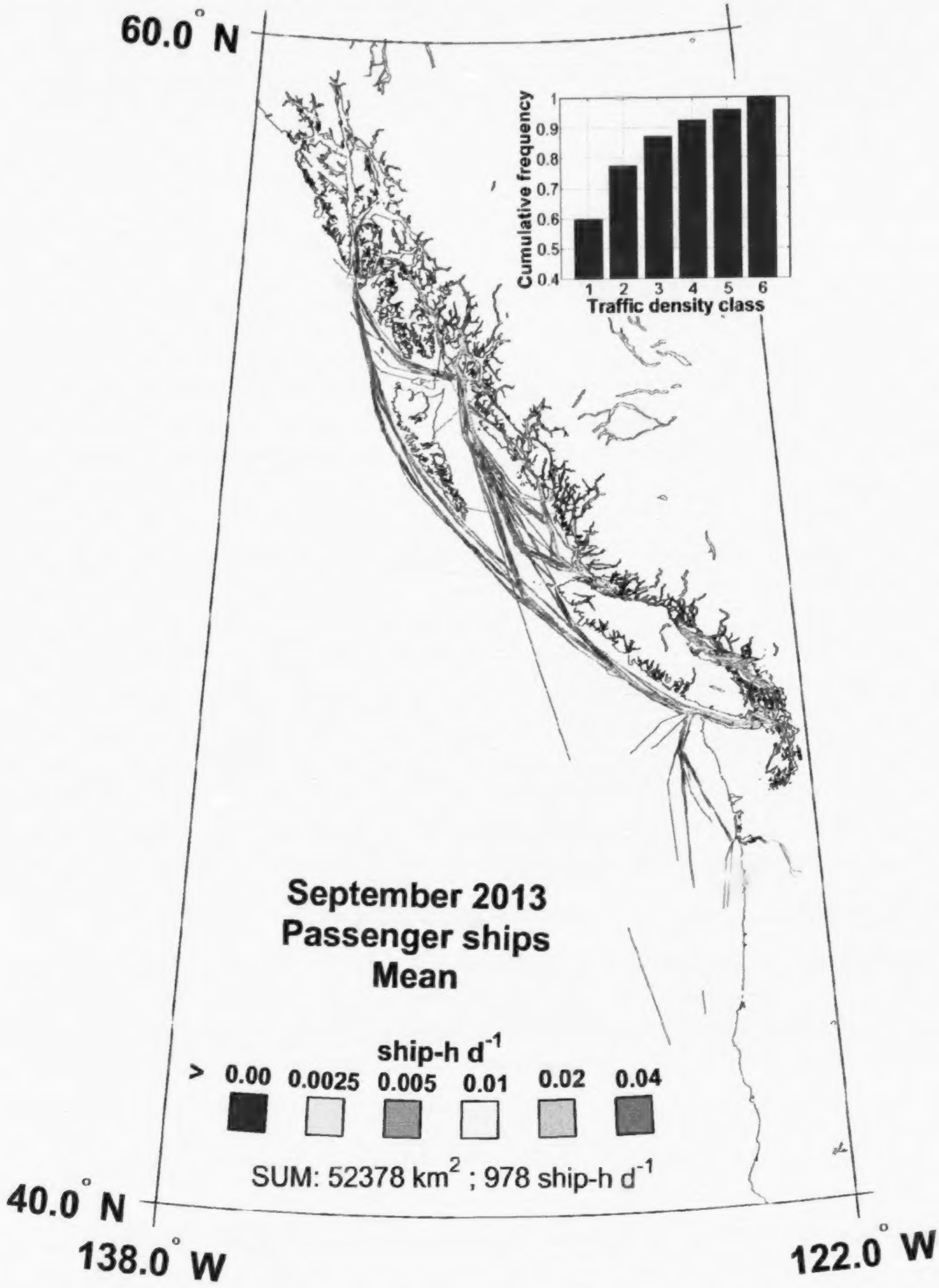

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
Passenger ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 52378 km^2 ; 978 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 218. Map of AIS mean traffic density of passenger-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

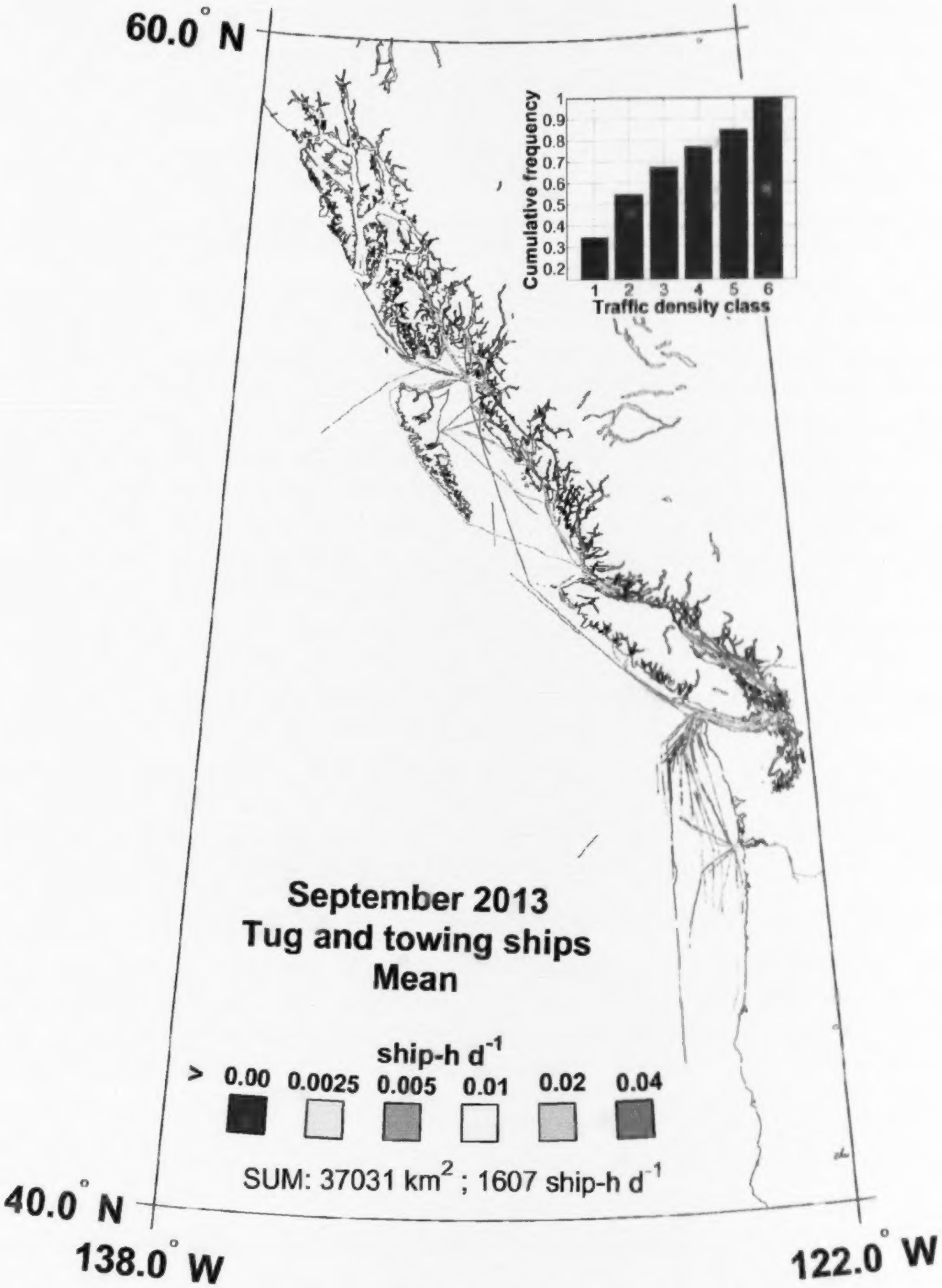

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
September 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 37031 km^2 ; 1607 ship-h d^{-1}

Figure 219. Map of AIS mean traffic density of tug and towing -type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

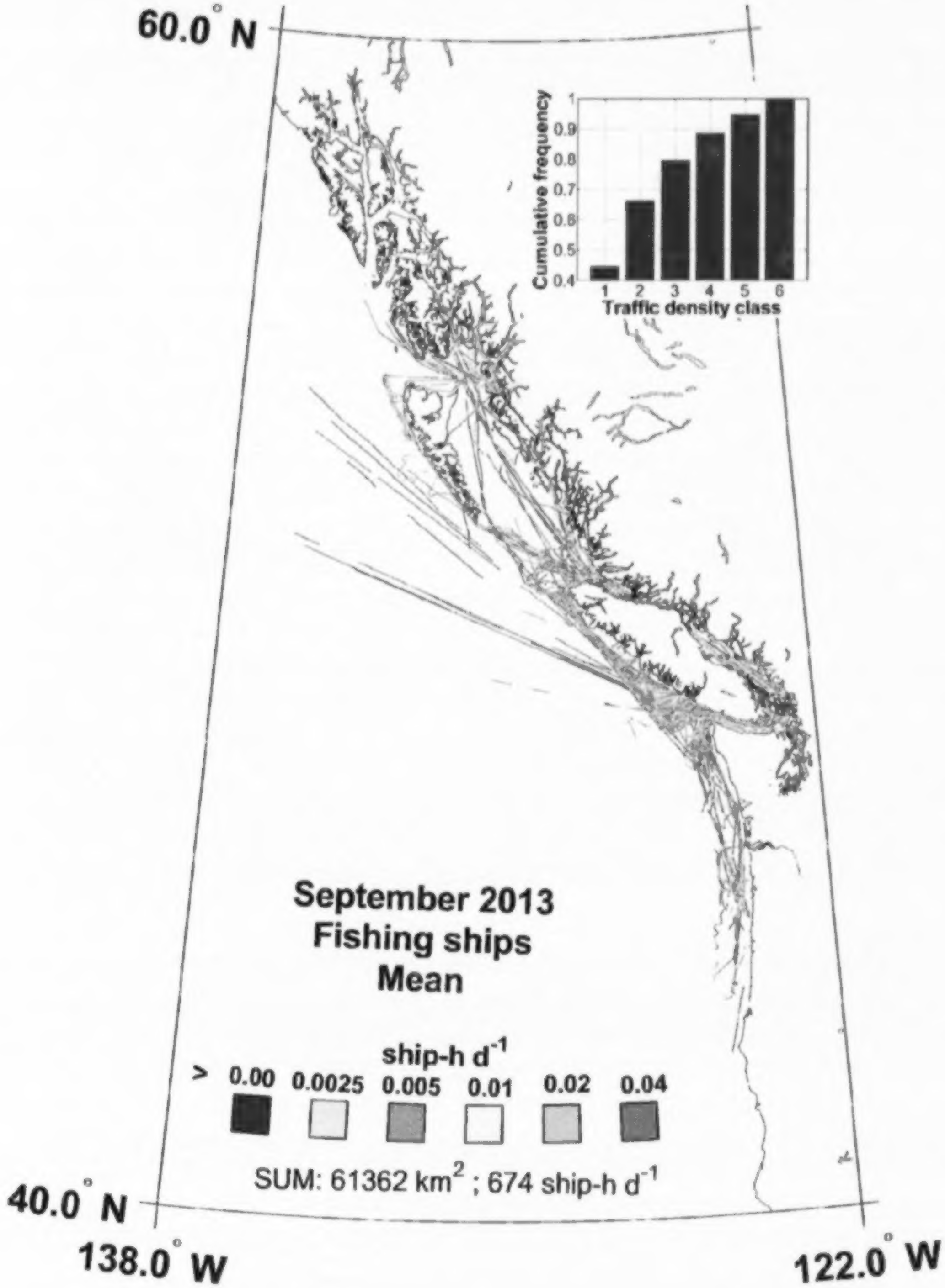

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 61362 km^2 ; 674 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 220. Map of AIS mean traffic density of fishing-type ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

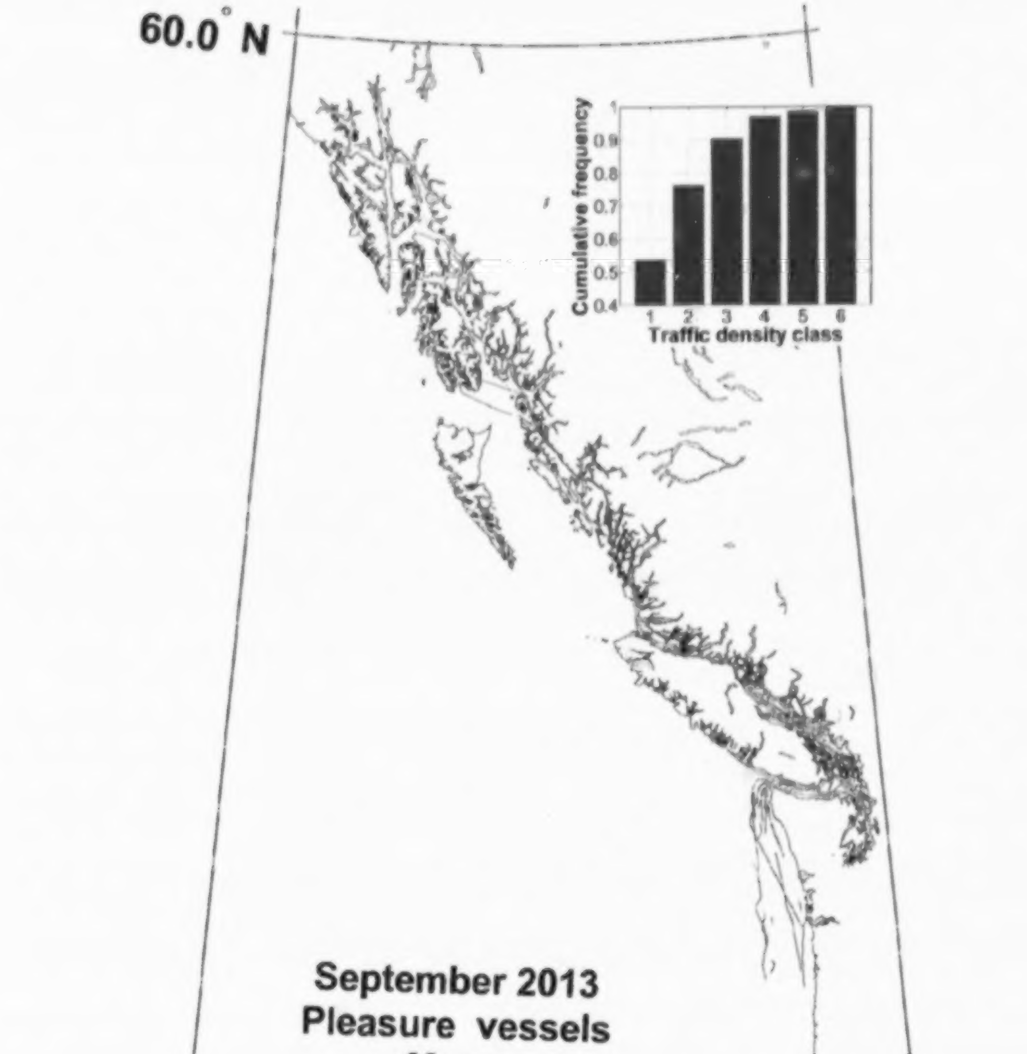

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 15525 km^2 ; 96 ship-h d^{-1}

Figure 221. Map of AIS mean traffic density of pleasure-type vessels in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

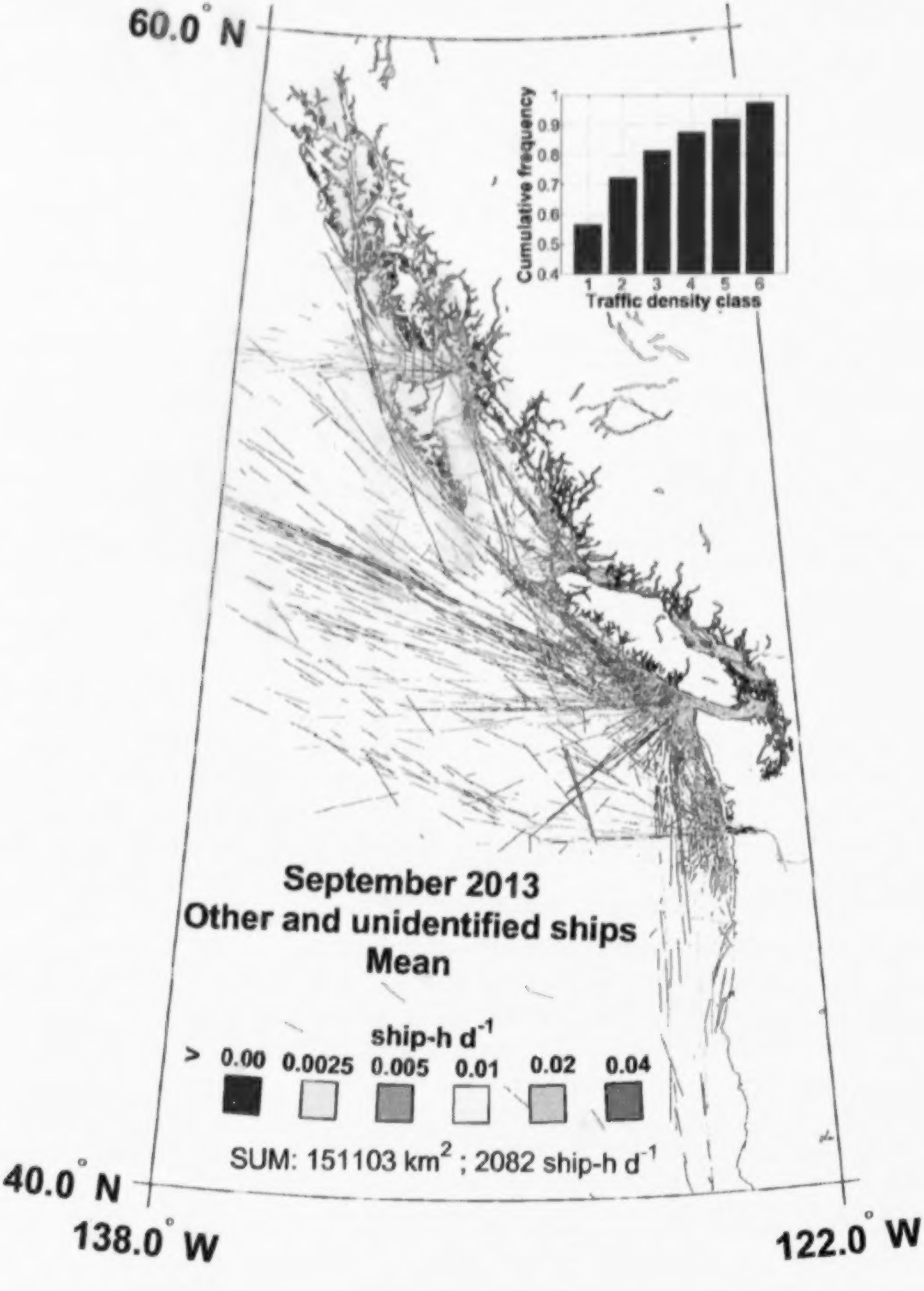

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
September 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 151103 km^2 ; 2082 ship-h d^{-1}

Figure 222. Map of AIS mean traffic density of other type of ships and ships of unidentified type in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

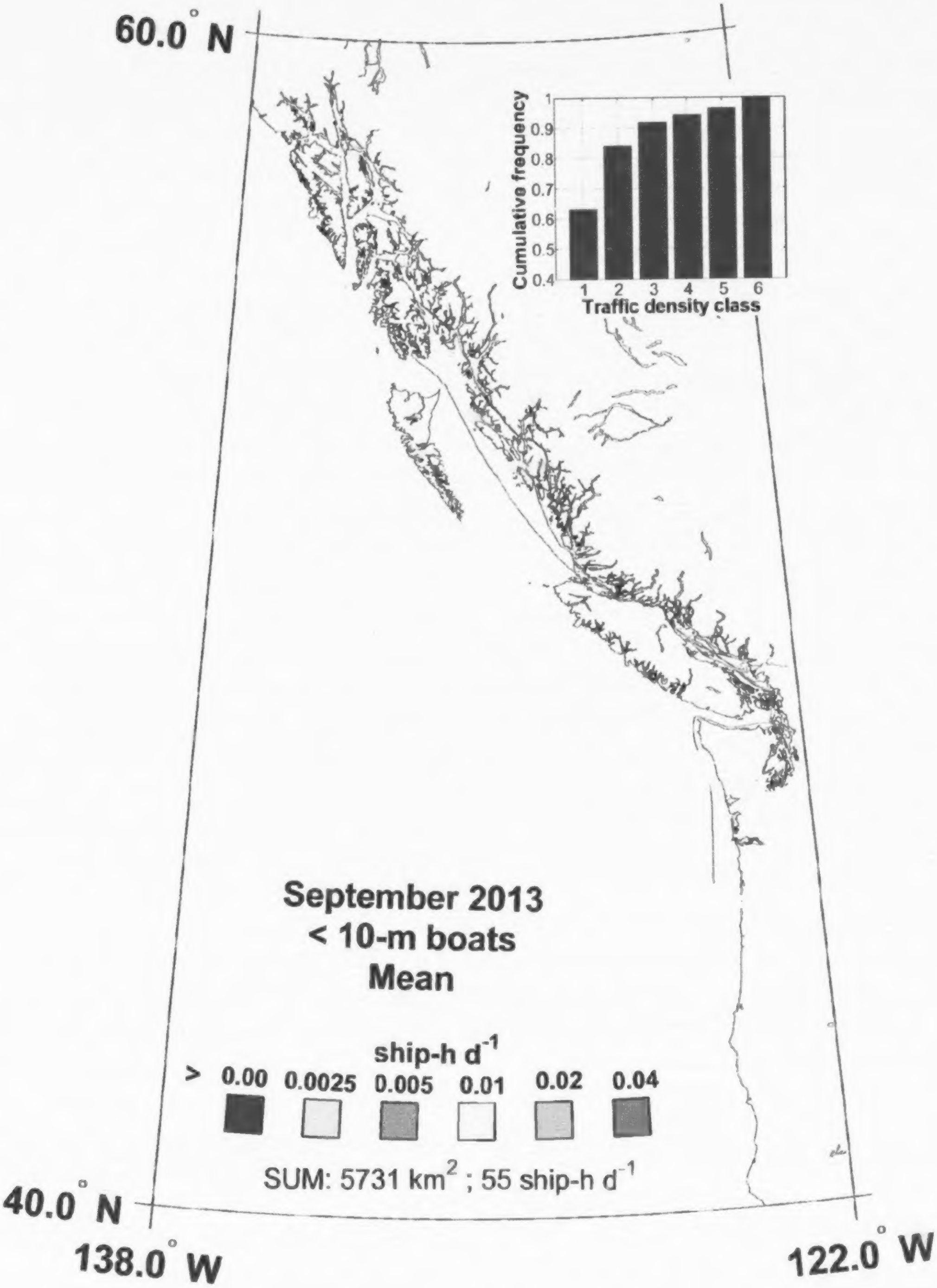

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
September 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 5731 km^2 ; 55 ship-h d^{-1}

Figure 223. Map of AIS mean traffic density of ships with lengths < 10 min September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

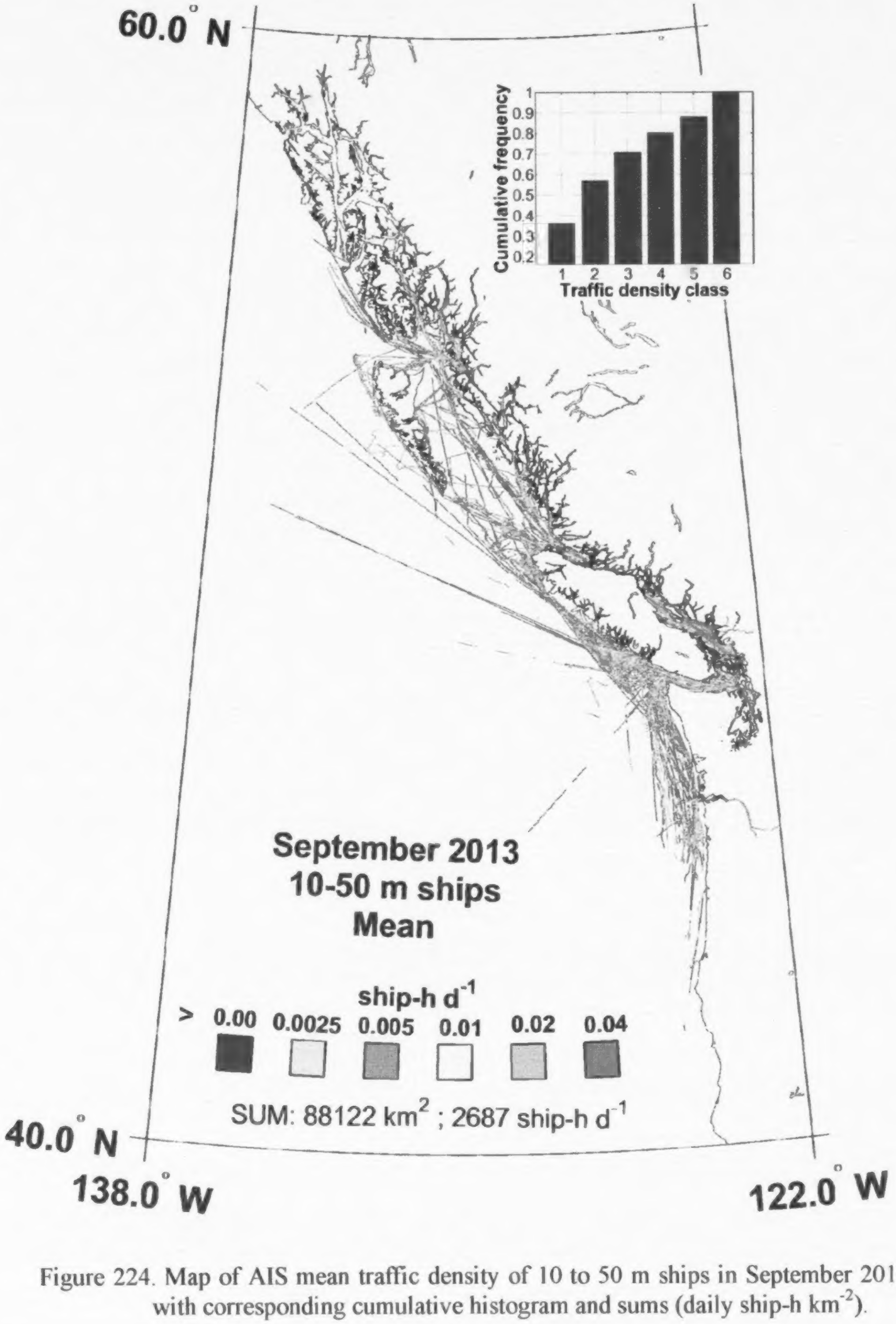

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
September 2013
10-50 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 88122 km² ; 2687 ship-h d⁻¹

Figure 224. Map of AIS mean traffic density of 10 to 50 m ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

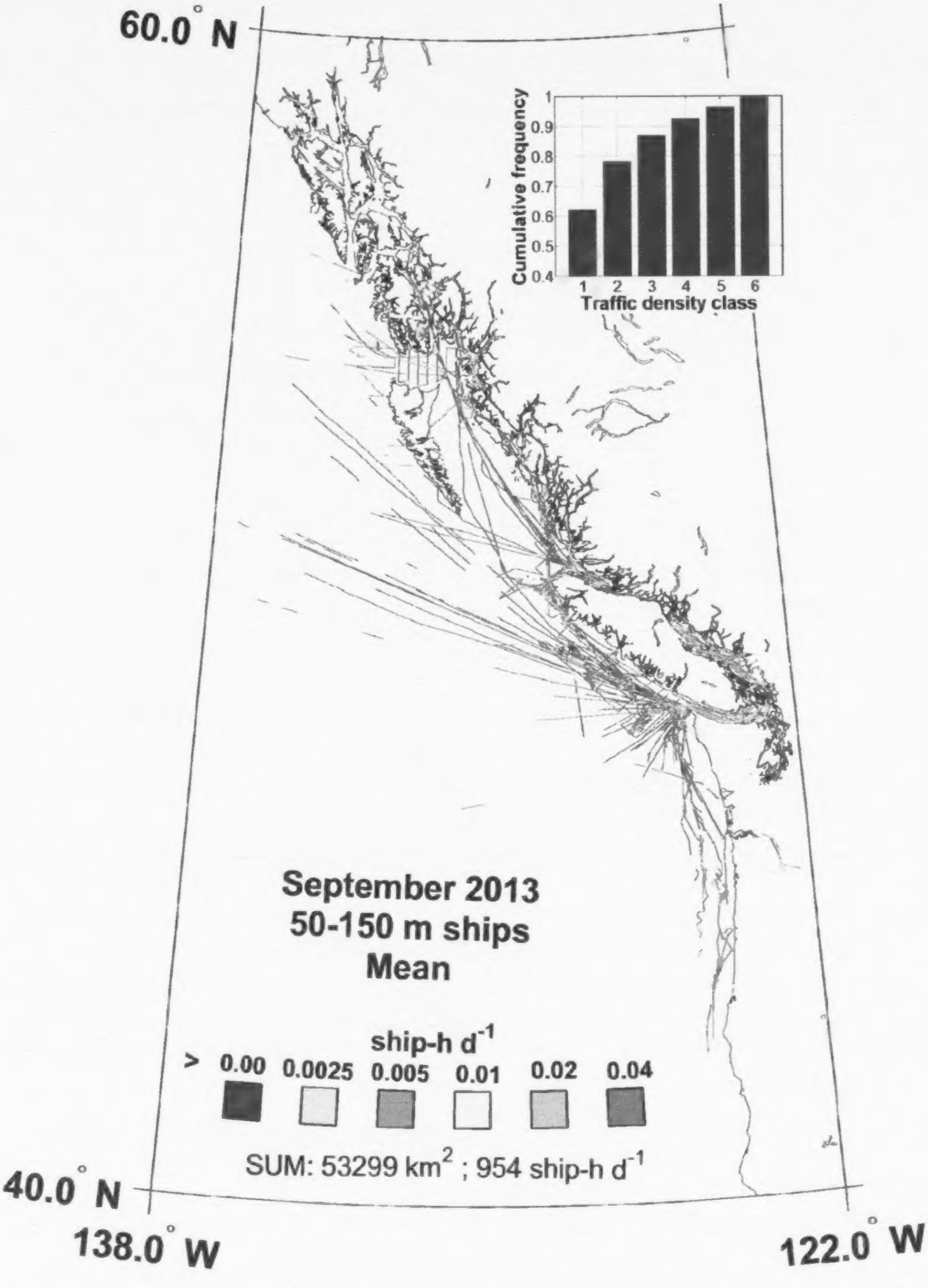

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
September 2013
50-150 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 53299 km^2 ; 954 ship-h d^{-1}

Figure 225. Map of AIS mean traffic density of 50 to 150 m ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

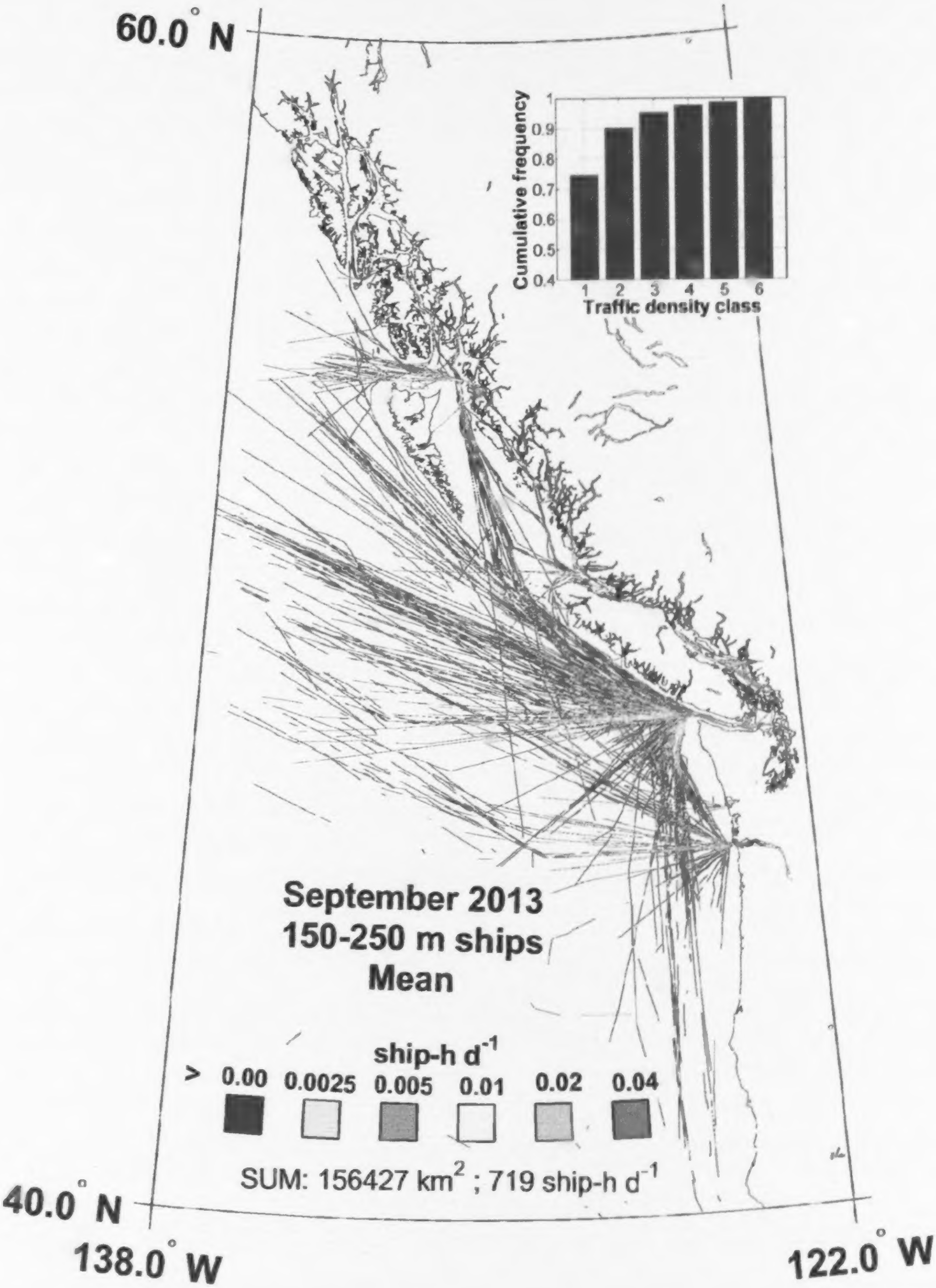

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
September 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 156427 km^2 ; 719 ship-h d^{-1}

Figure 226. Map of AIS mean traffic density of 150 to 250 m ships in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

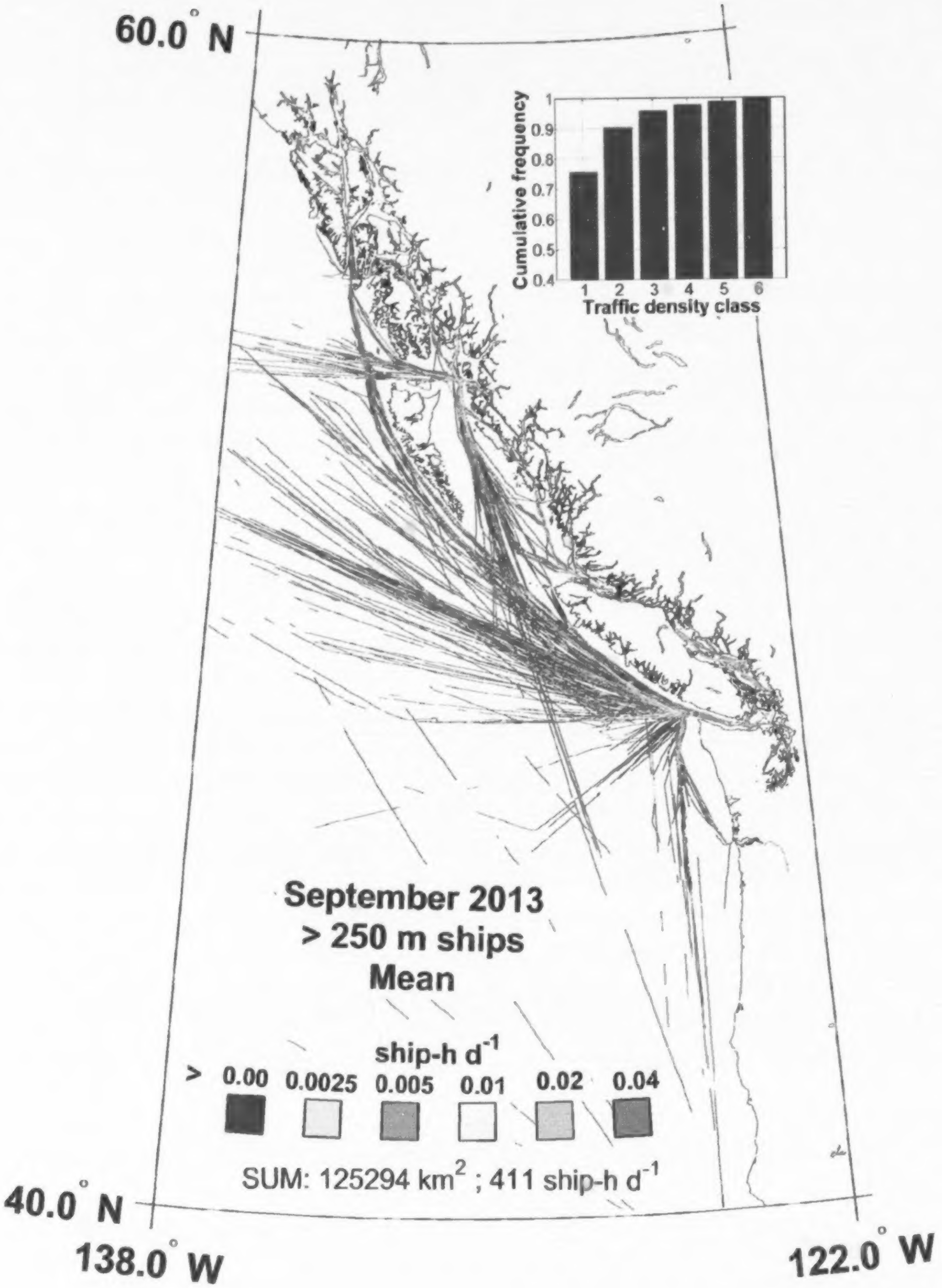

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
September 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 125294 km^2 ; 411 ship-h d^{-1}

Figure 227. Map of >250 m ship AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

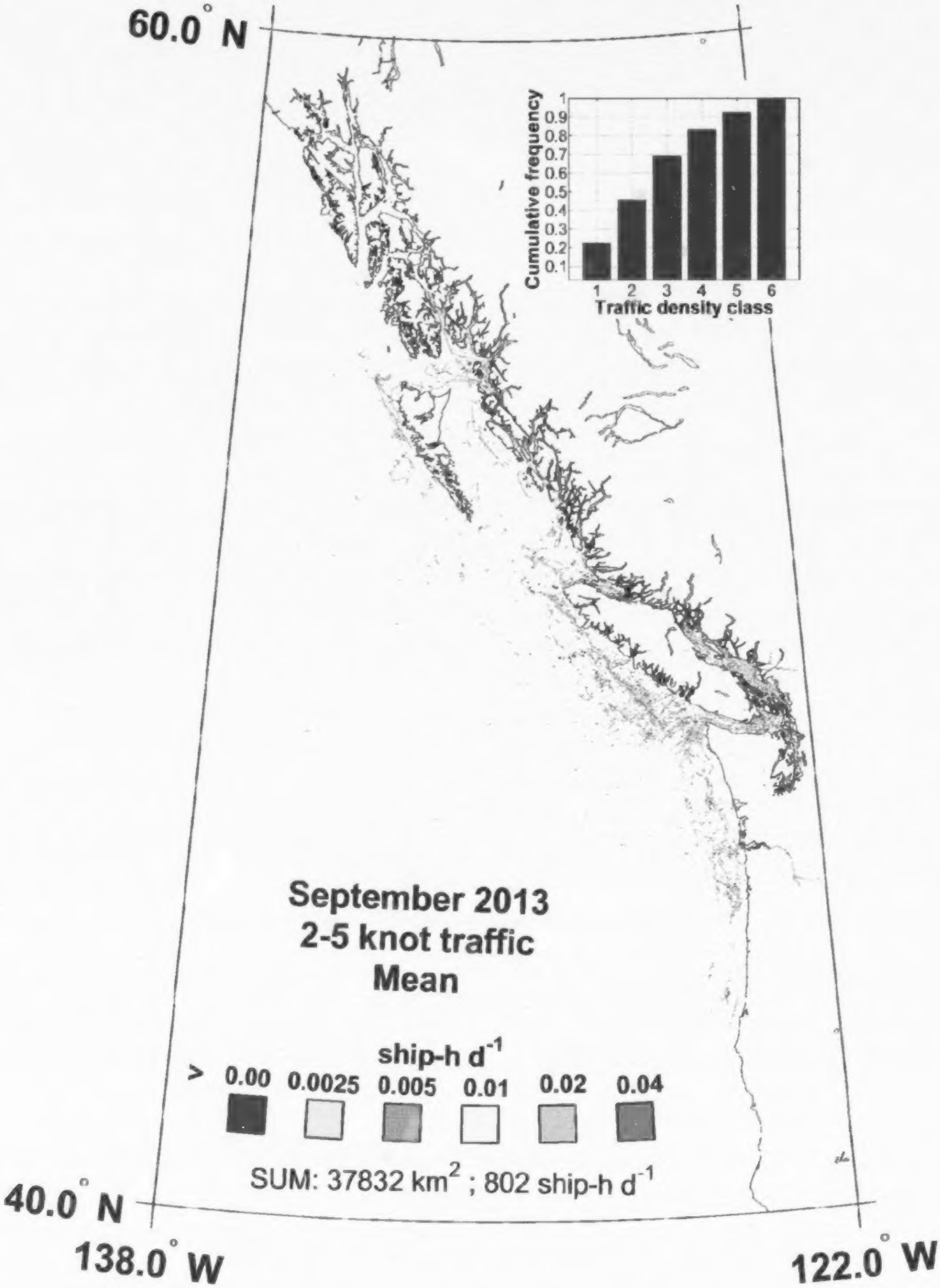

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1 2 3 4 5 6
Traffic density class
September 2013
2-5 knot traffic
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 37832 km2 ; 802 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 228. Map of 2–5 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

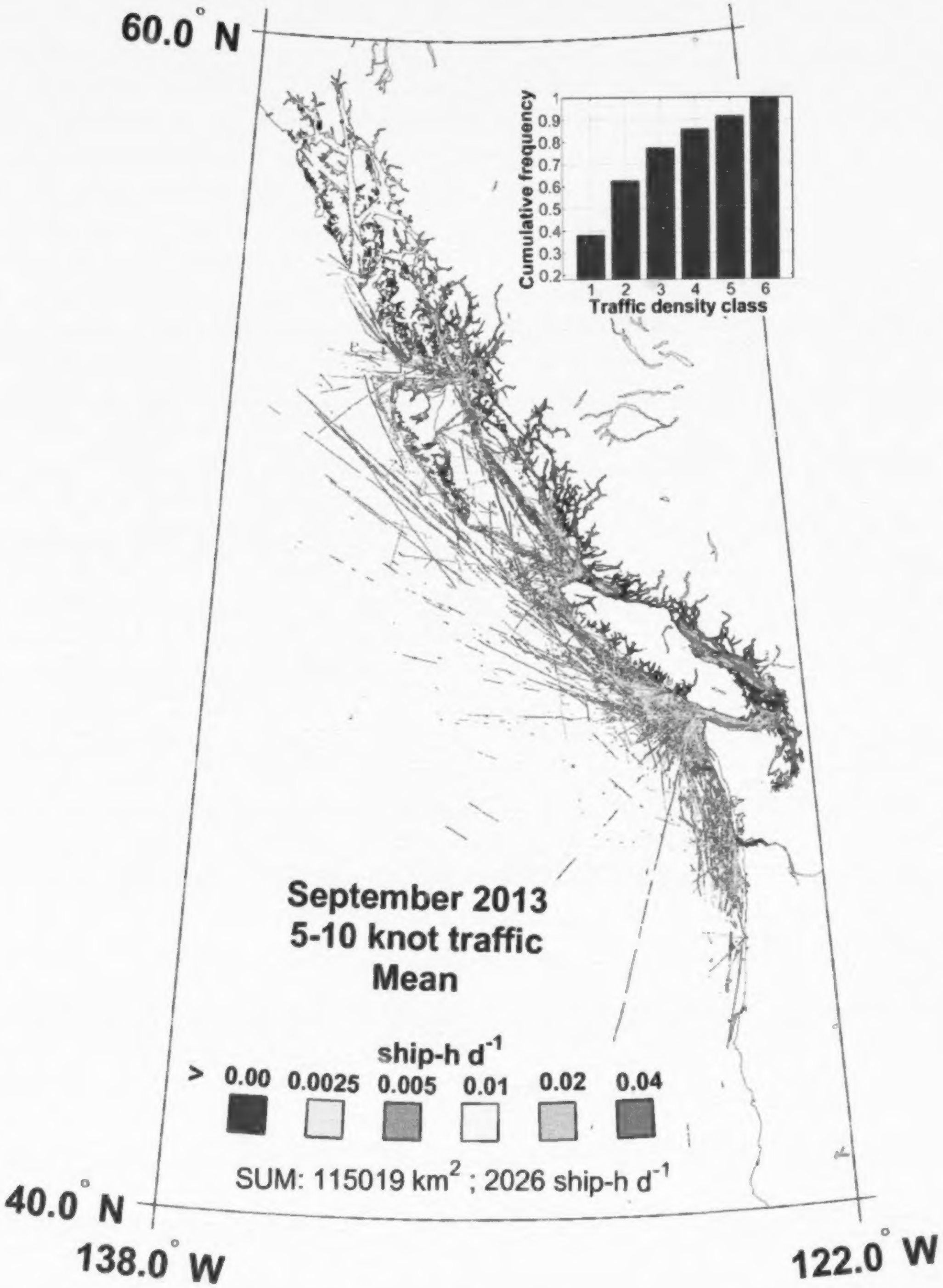

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
September 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 115019 km^2 ; 2026 ship-h d^{-1}

Figure 229. Map of 5–10 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

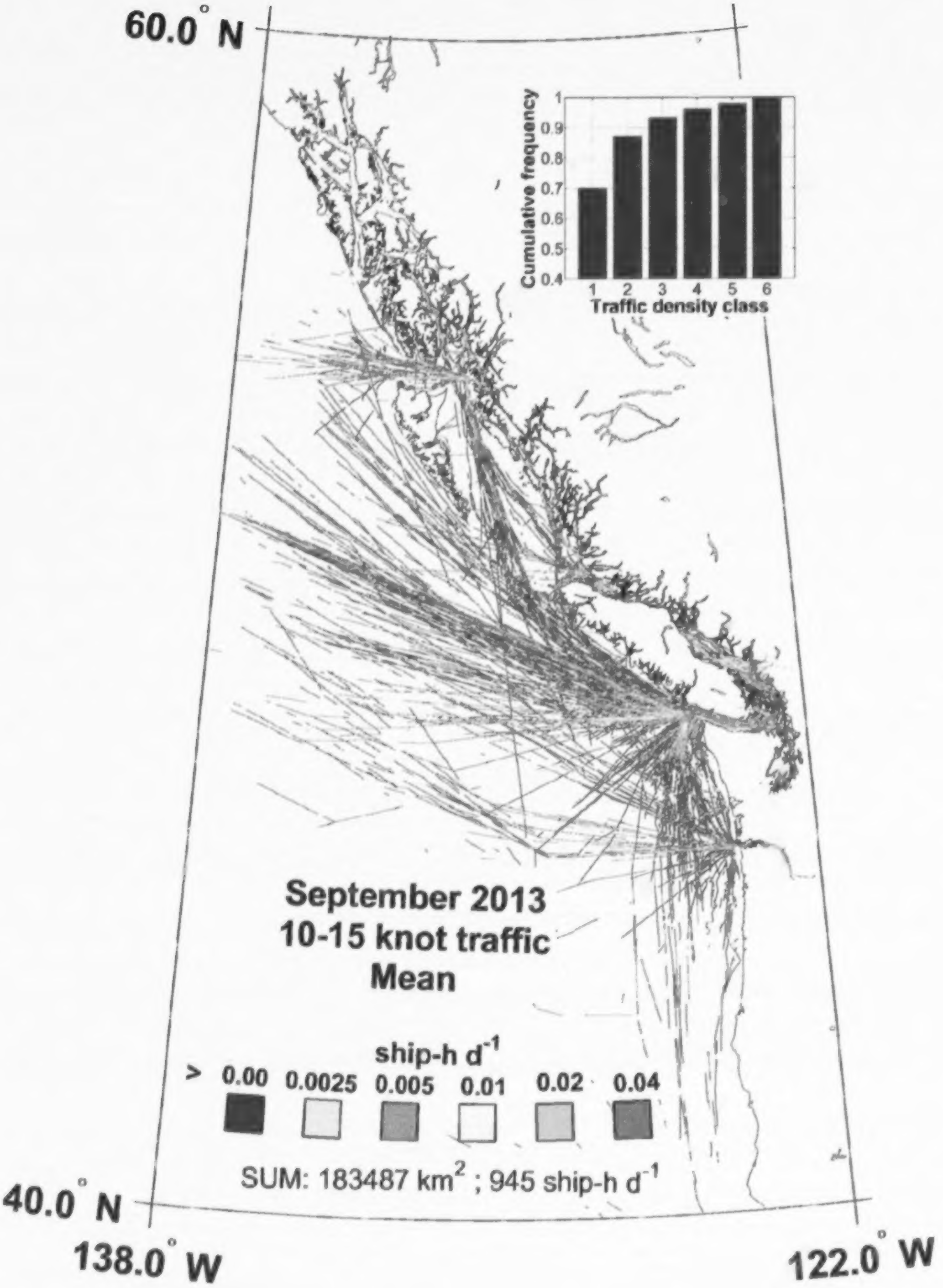

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 183487 km^2 ; 945 ship-h d^{-1}

Figure 230. Map of 10–15 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

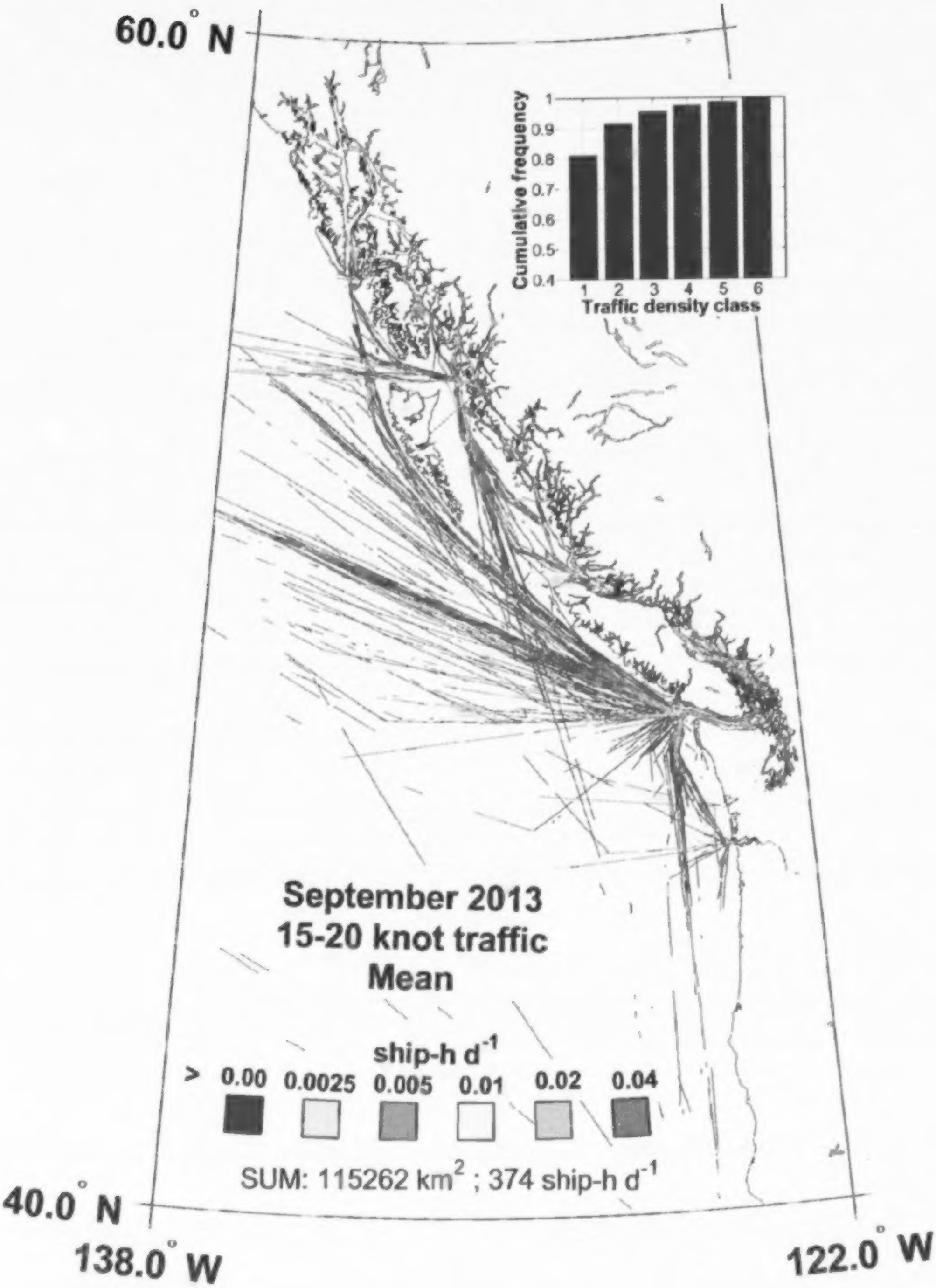

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 115262 km^2 ; 374 ship-h d^{-1}

Figure 231. Map of 15–20 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

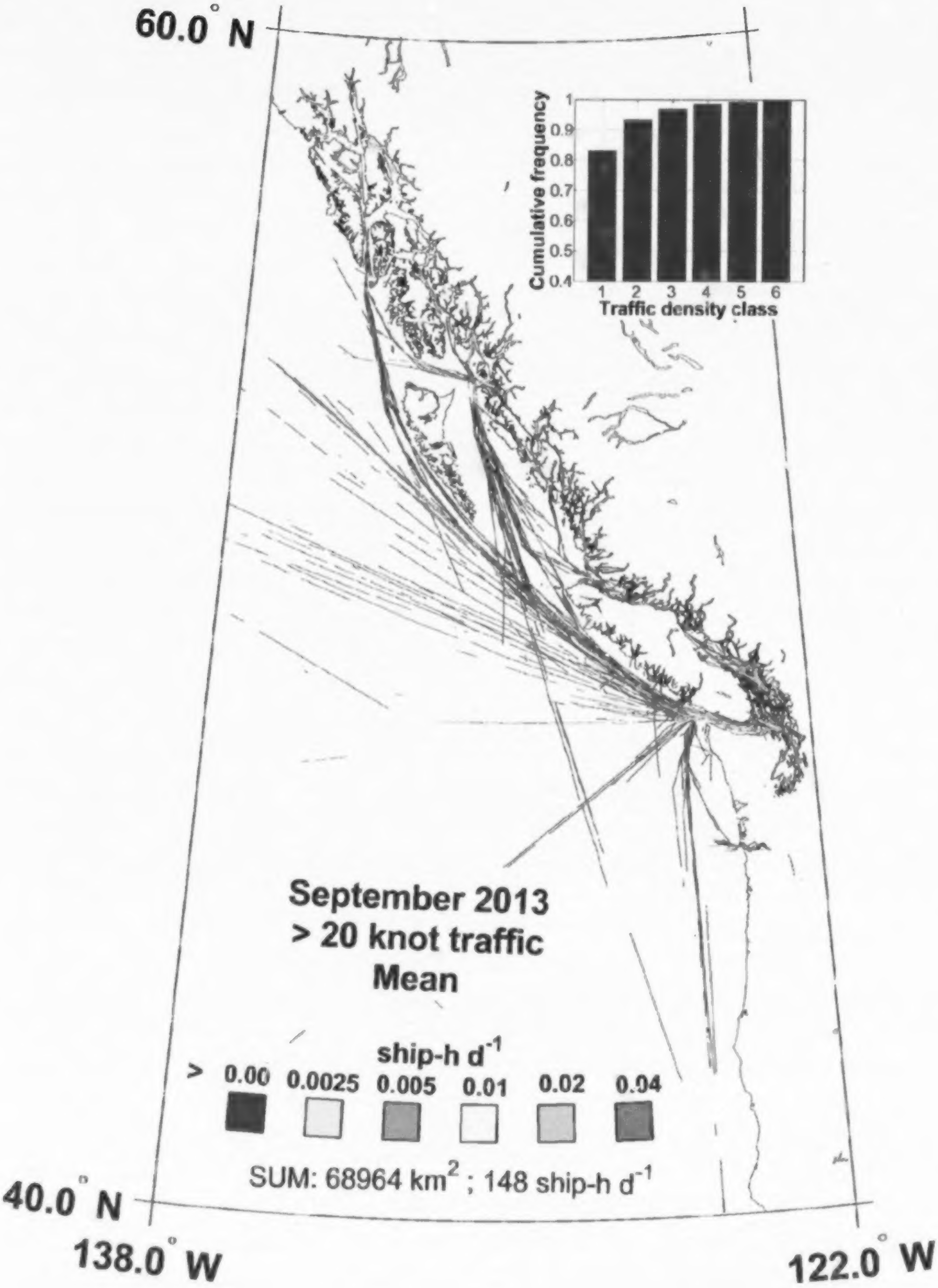

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
September 2013
> 20 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 68964 km2 ; 148 ship-h d-1

Figure 232. Map of >20 knot AIS mean traffic density in September 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.10. October 2013

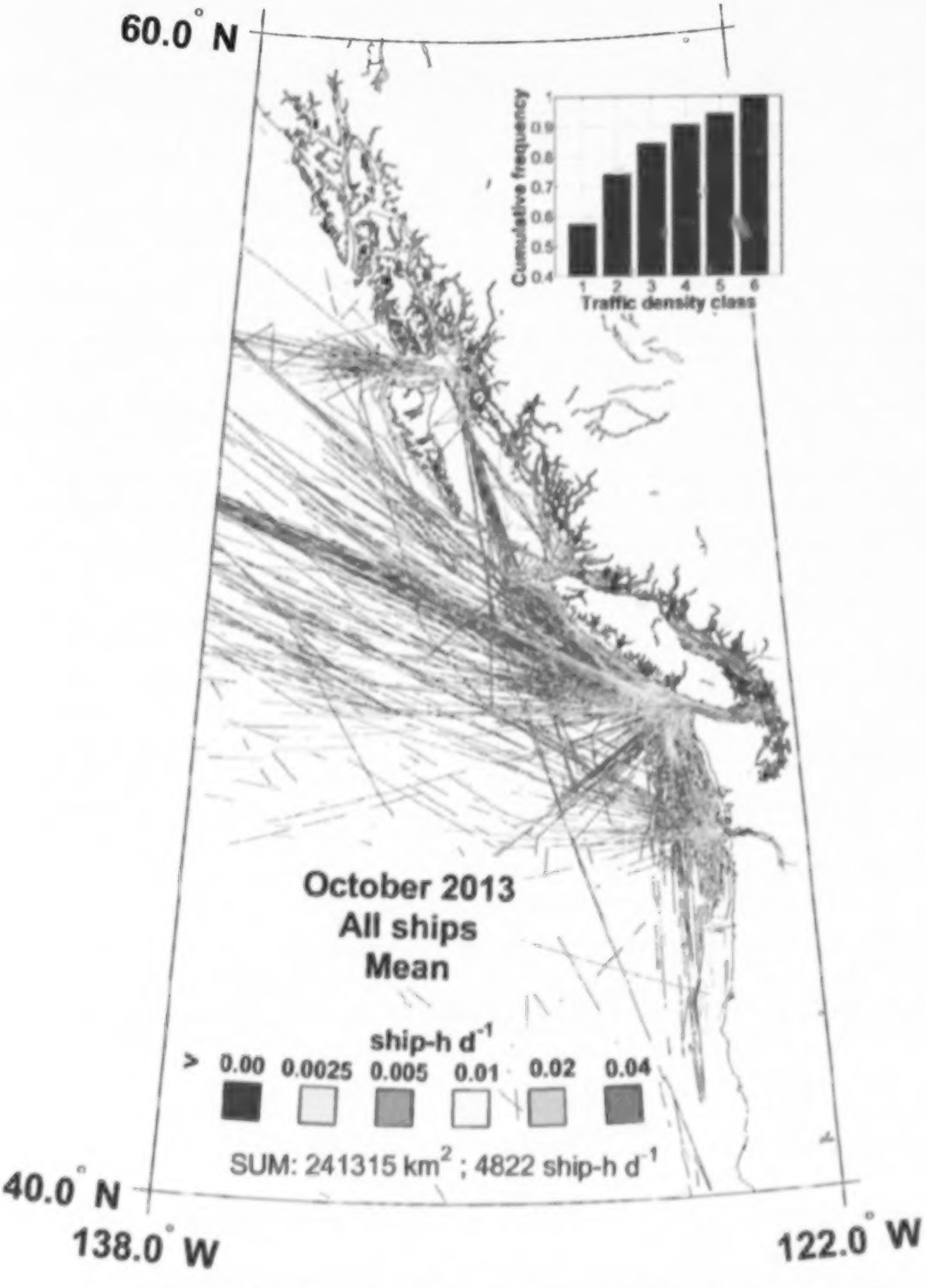

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
All ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 241315 km² ; 4822 ship-h d⁻¹

Figure 233. Map of AIS mean traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

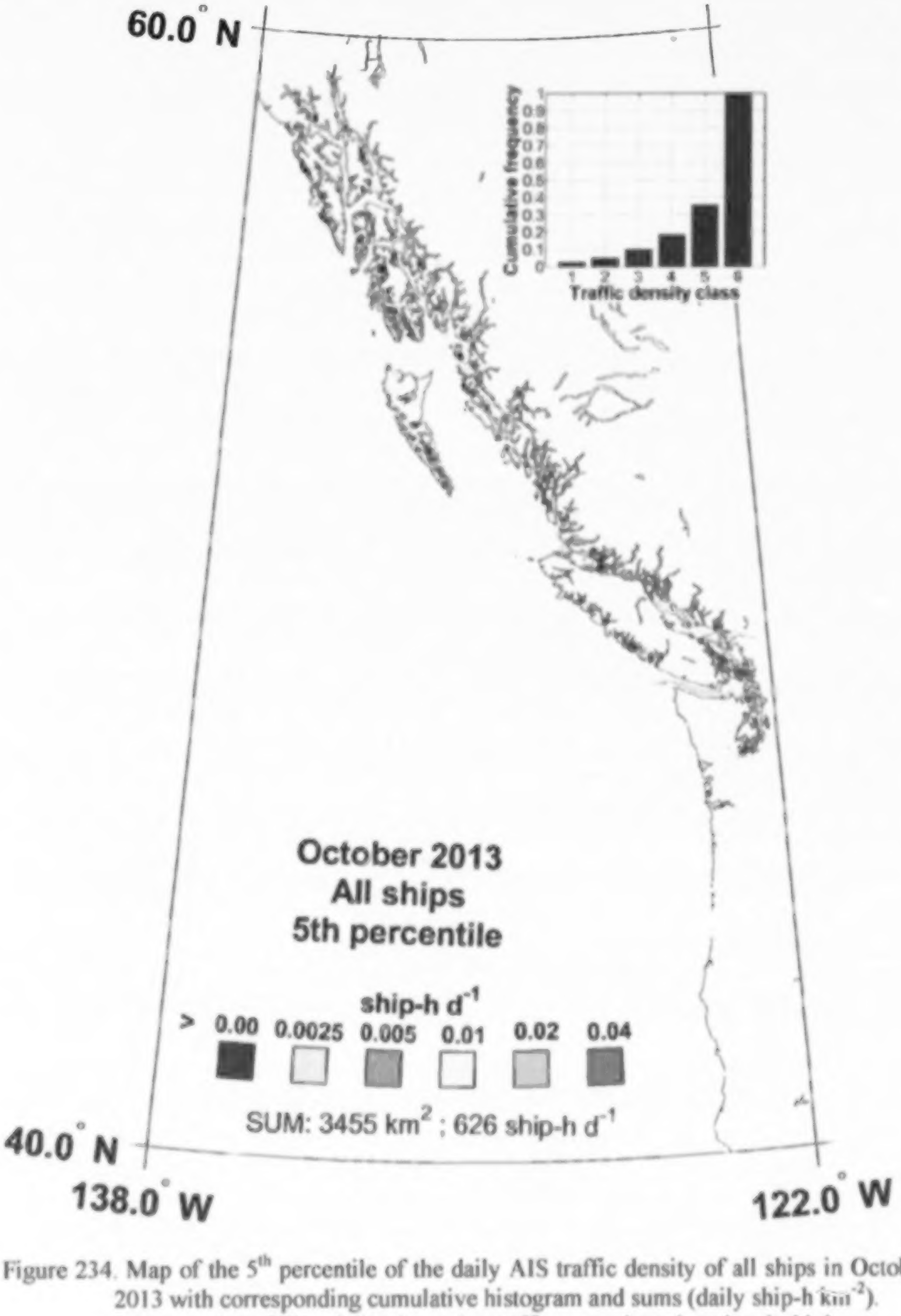

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
October 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 3455 km^2 ; 626 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 234. Map of the 5th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

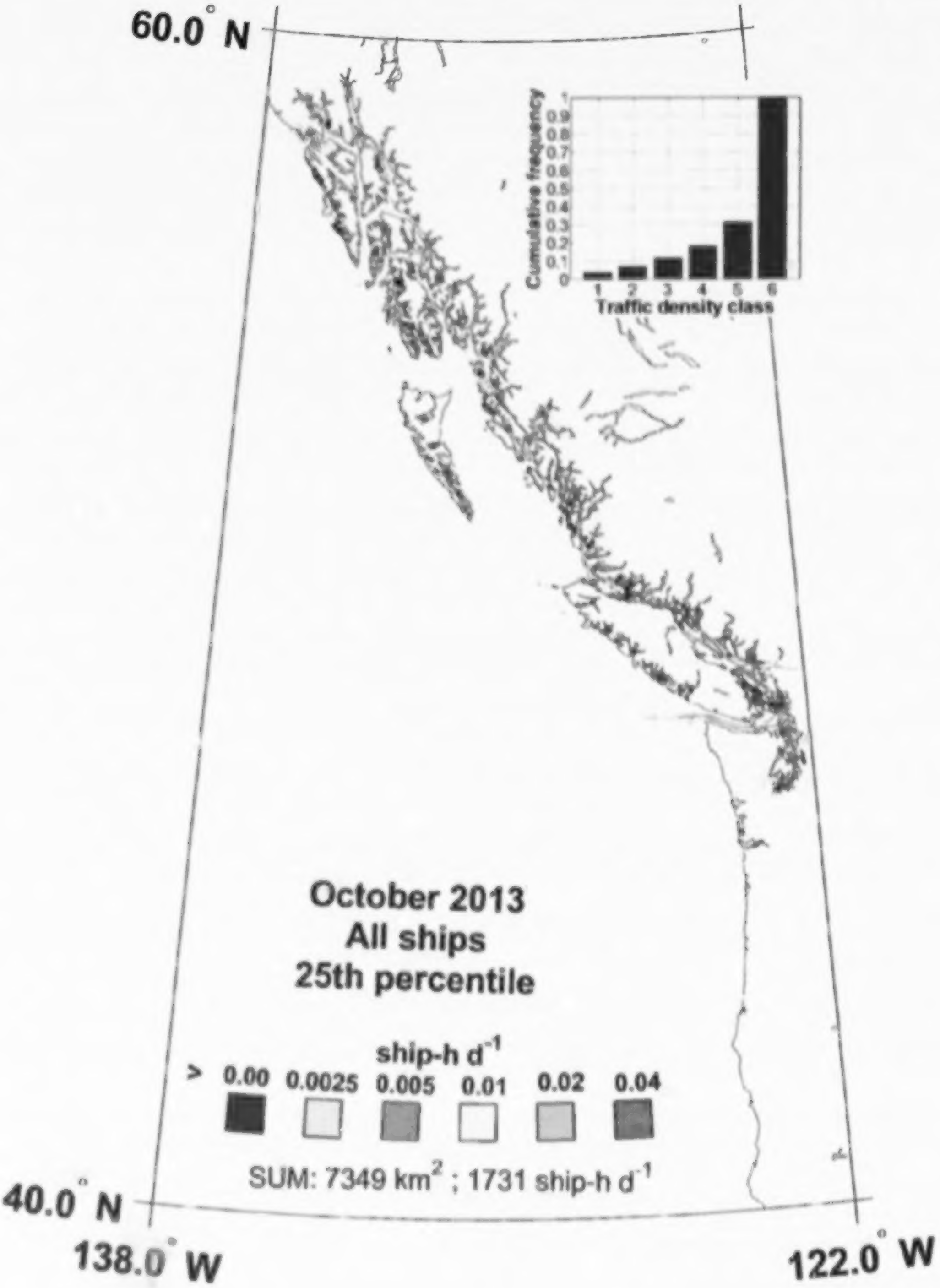

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
All ships
25th percentile
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7349 km² ; 1731 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 235. Map of the 25th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

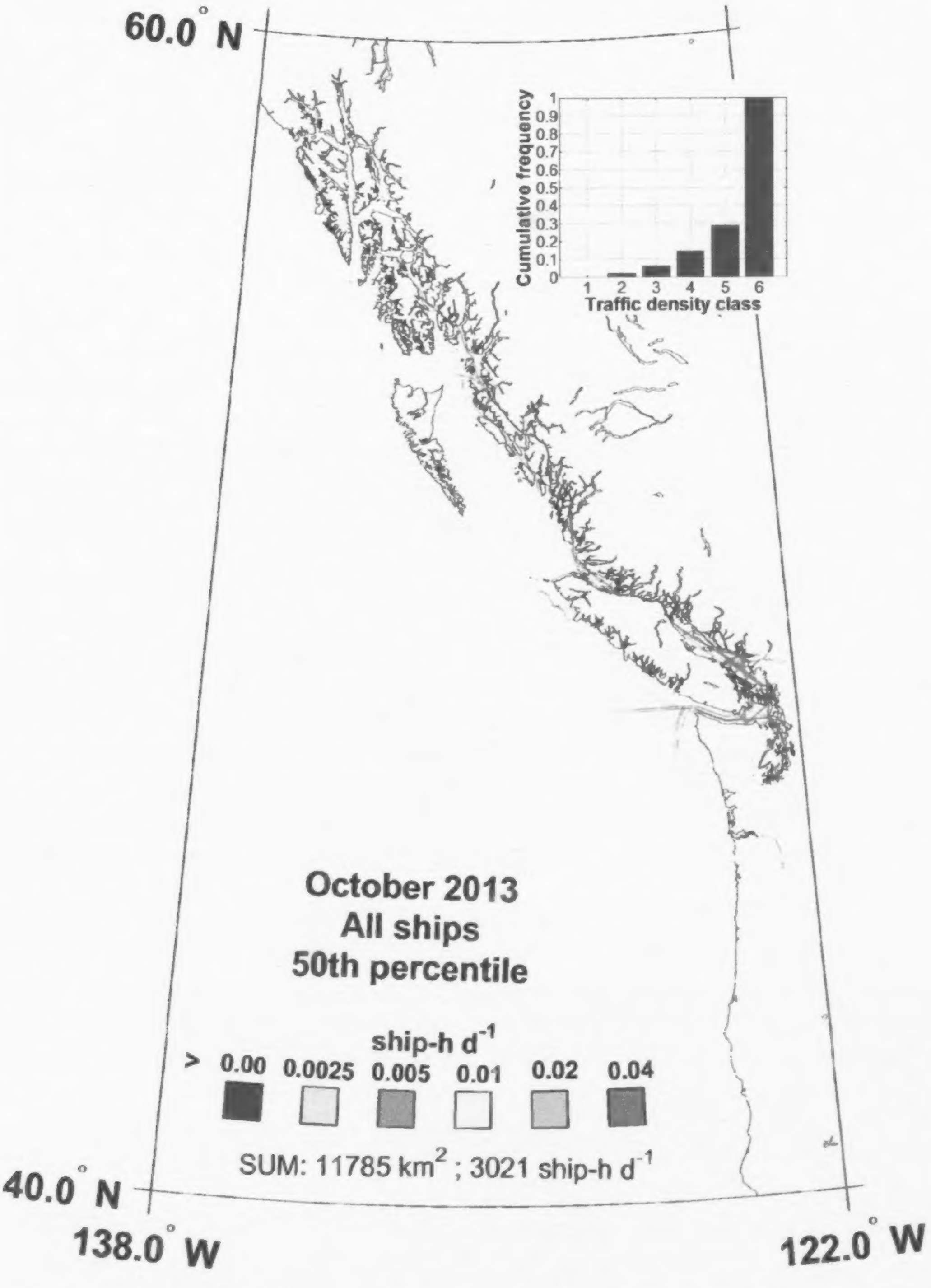

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
All ships
50th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 11785 km^2 ; 3021 ship-h d^{-1}

Figure 236. Map of the 50th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

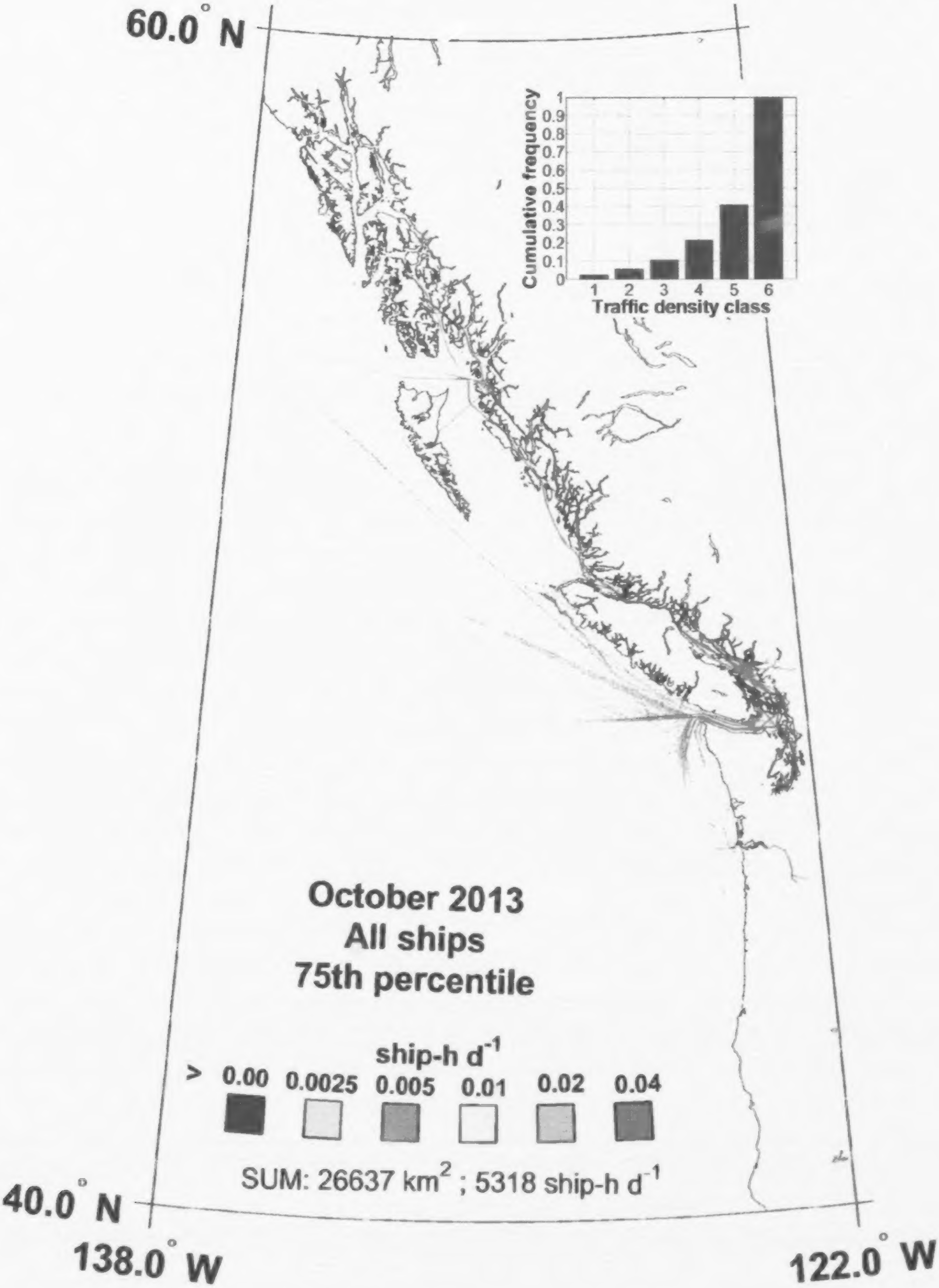

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1 2 3 4 5 6
Traffic density class
October 2013
All ships
75th percentile
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 26637 km^2 ; 5318 ship-h d^{-1}

Figure 237. Map of the 75th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

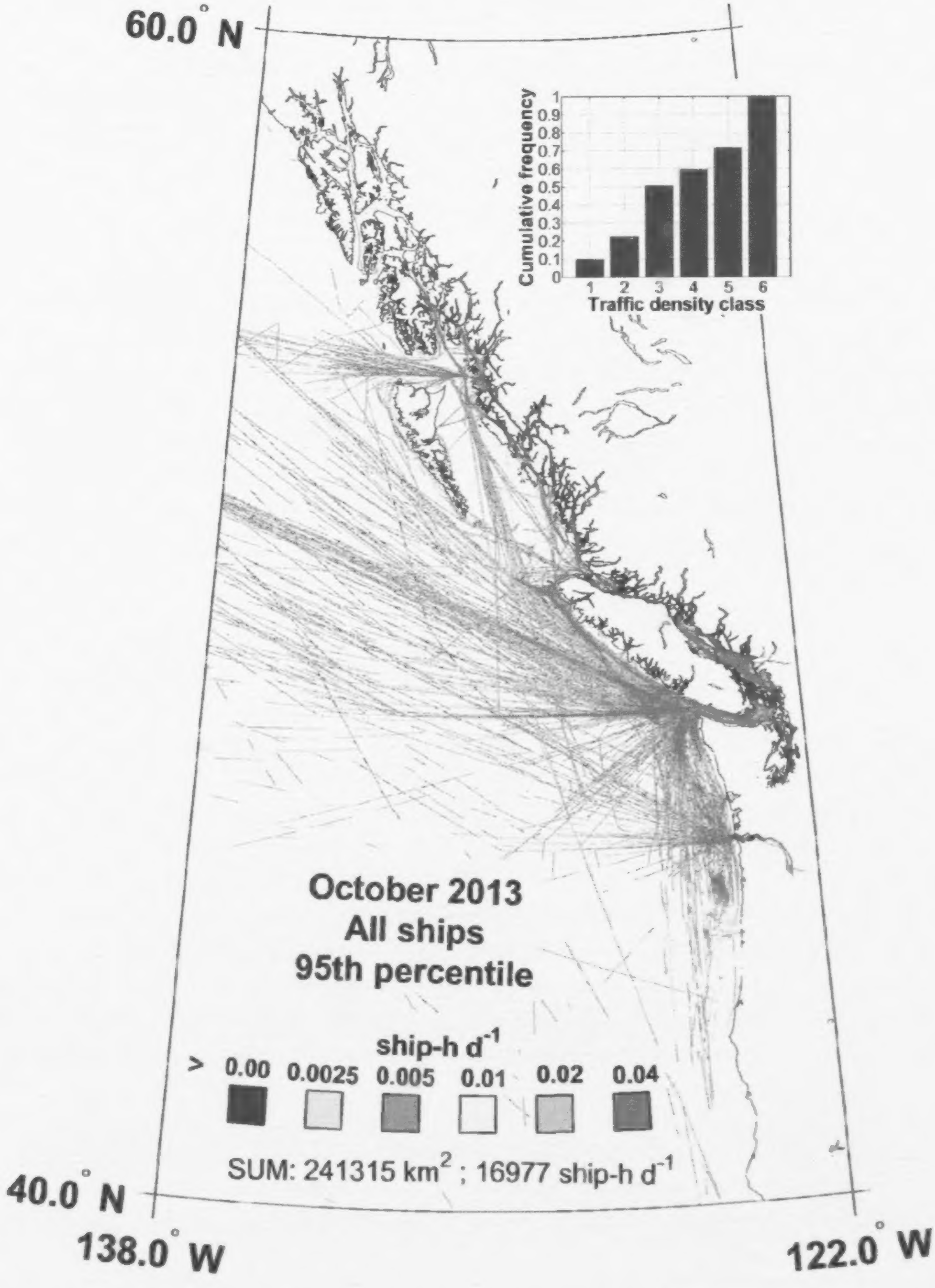

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 241315 km^2 ; 16977 ship-h d^{-1}

Figure 238. Map of the 95th percentile of the daily AIS traffic density of all ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

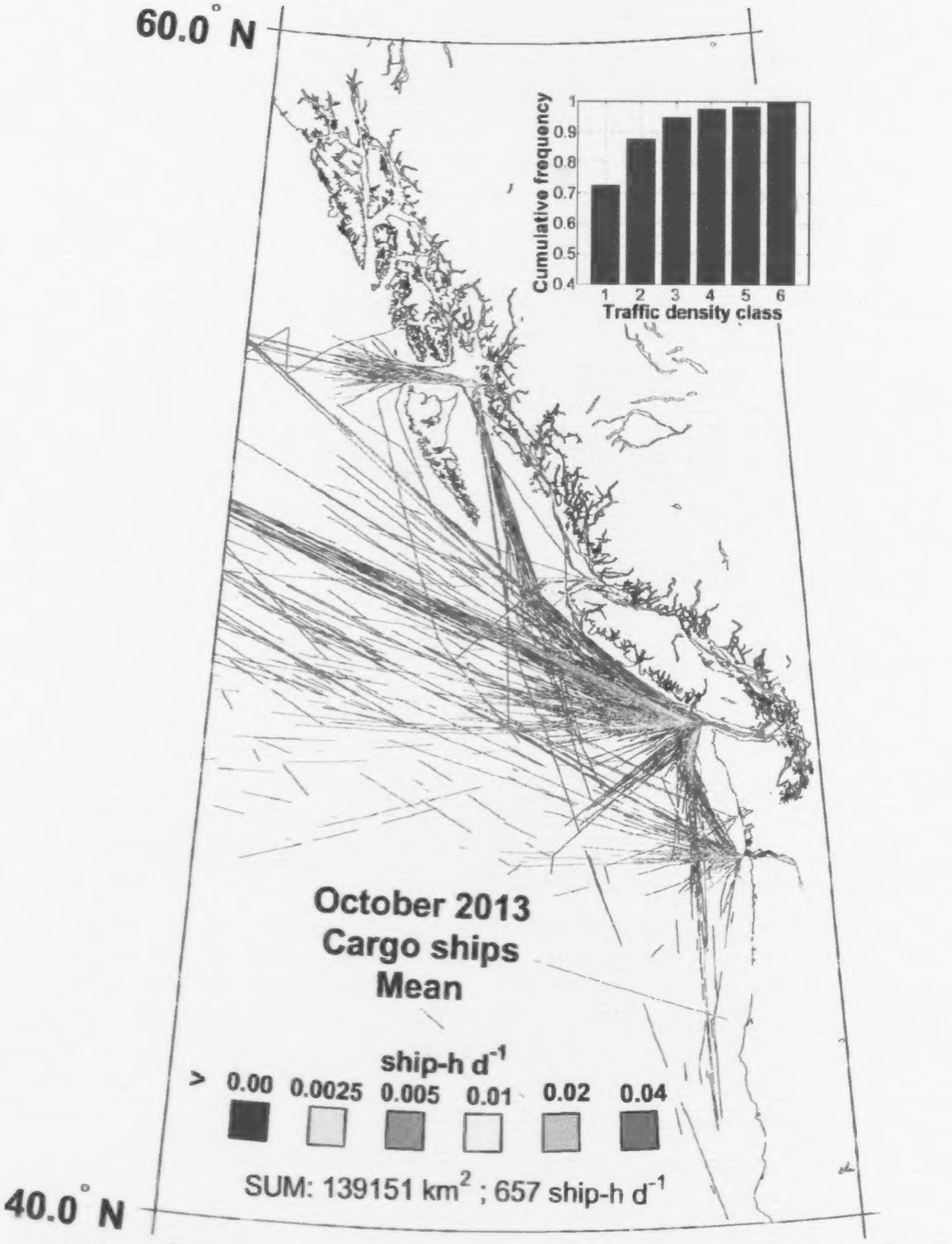

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 139151 km^2 ; 657 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 239. Map of AIS mean traffic density of cargo-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

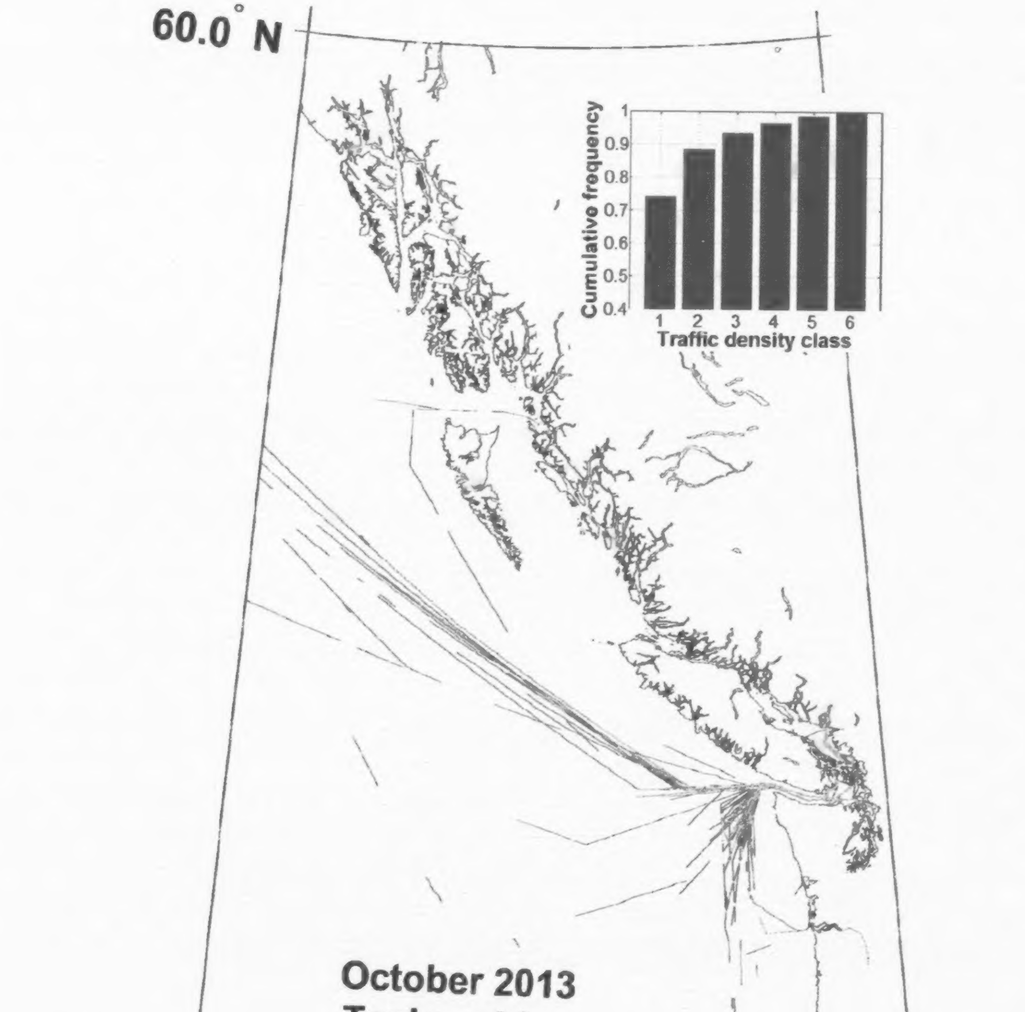

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
Tanker ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 22076 km² ; 88 ship-h d⁻¹

Figure 240. Map of AIS mean traffic density of tanker-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

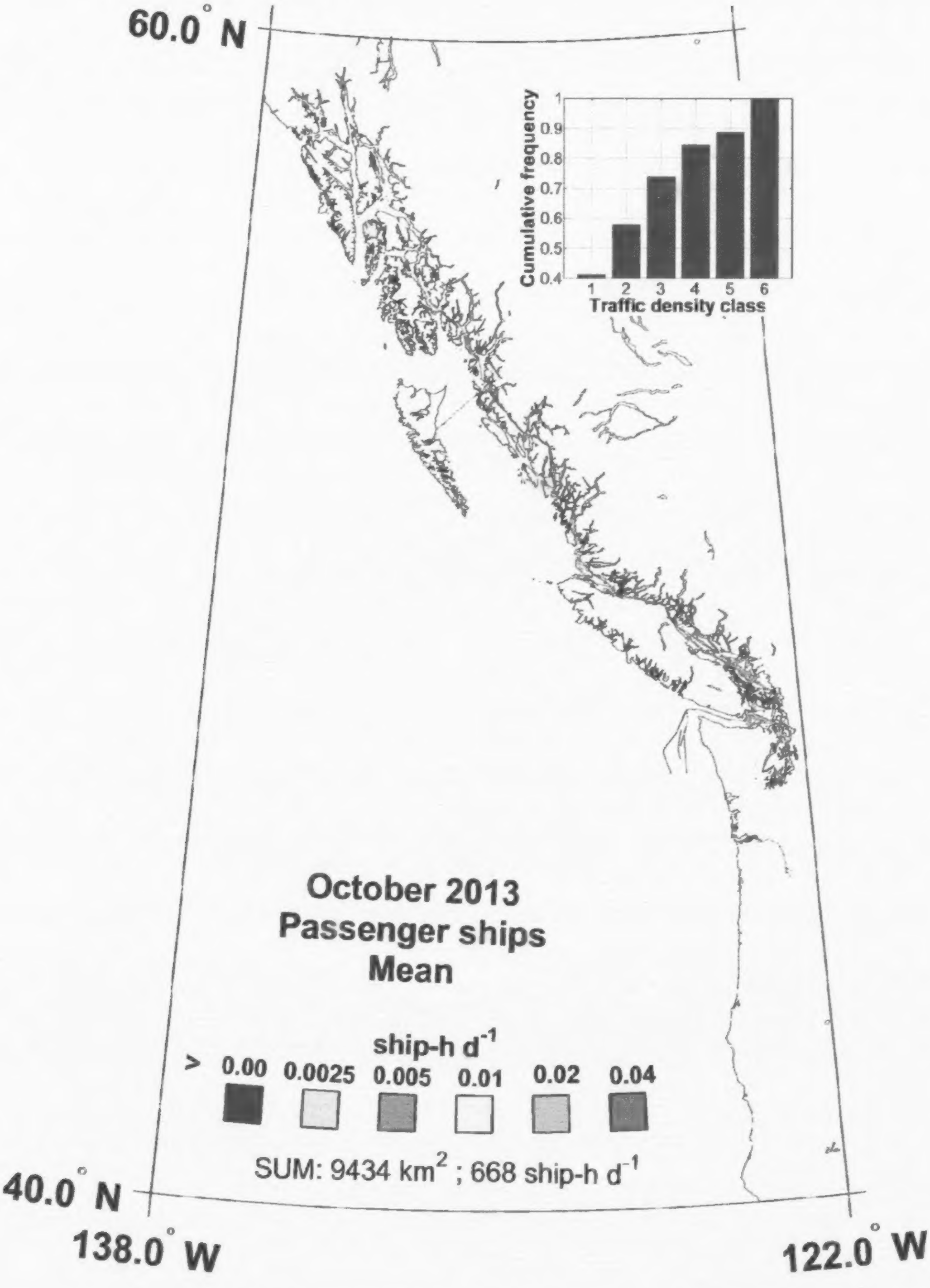

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
Passenger ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 9434 km2 ; 668 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 241. Map of AIS mean traffic density of passenger-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

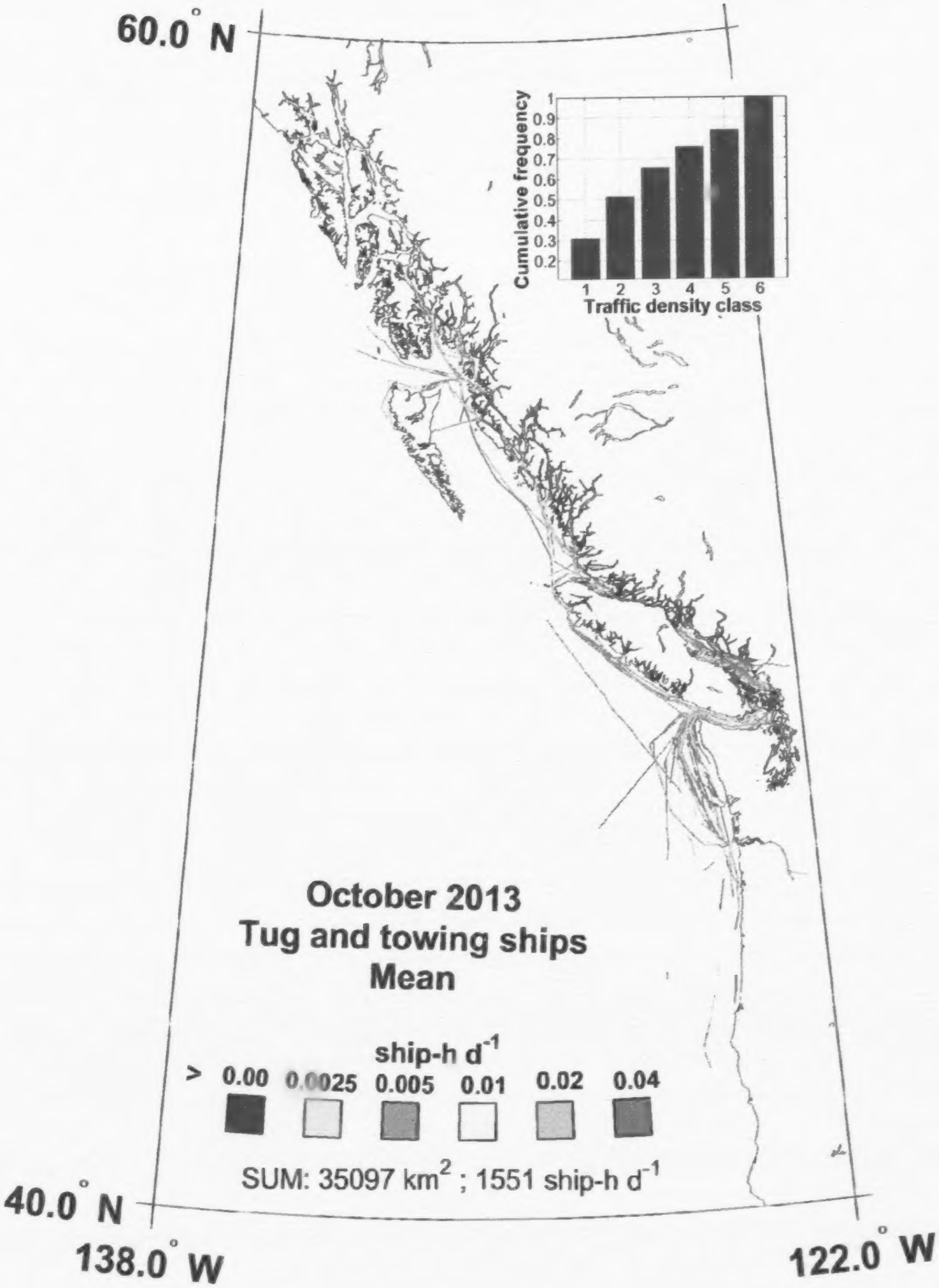

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
October 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 35097 km^2 ; 1551 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 242. Map of AIS mean traffic density of tug and towing -type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

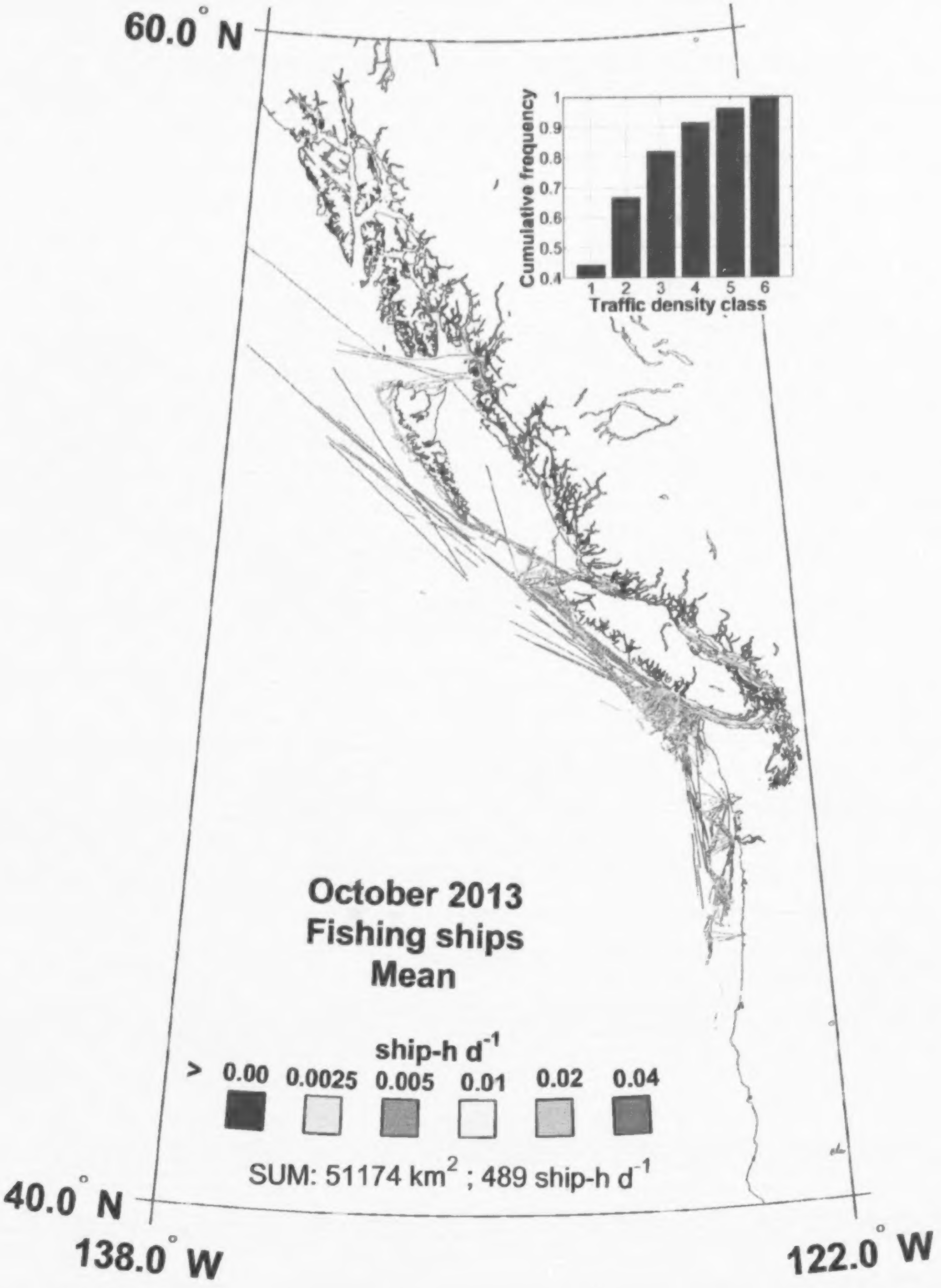

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 51174 km^2 ; 489 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 243. Map of AIS mean traffic density of fishing-type ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

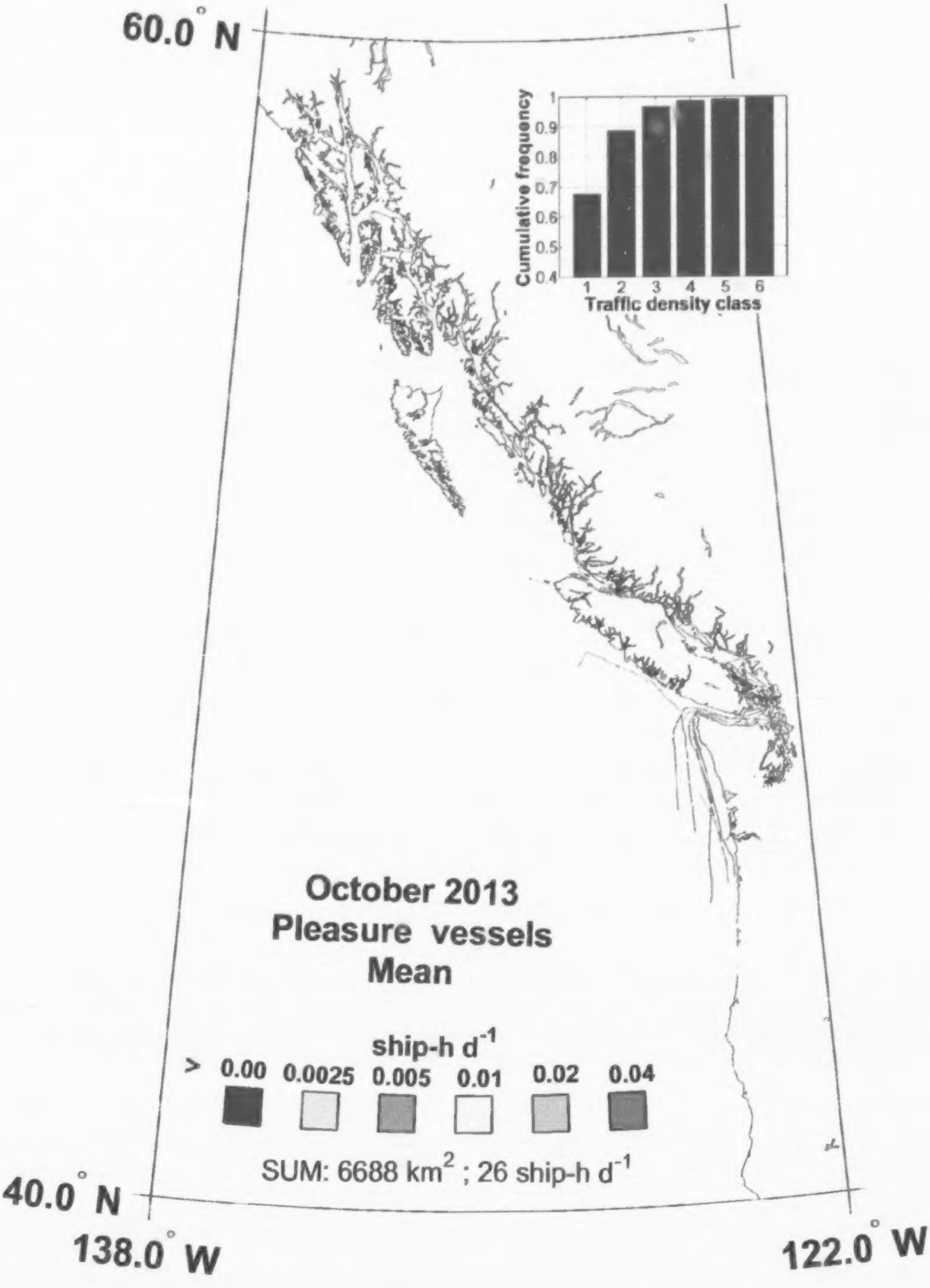

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 6688 km^2 ; 26 ship-h d^{-1}

Figure 244. Map of AIS mean traffic density of pleasure-type vessels in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

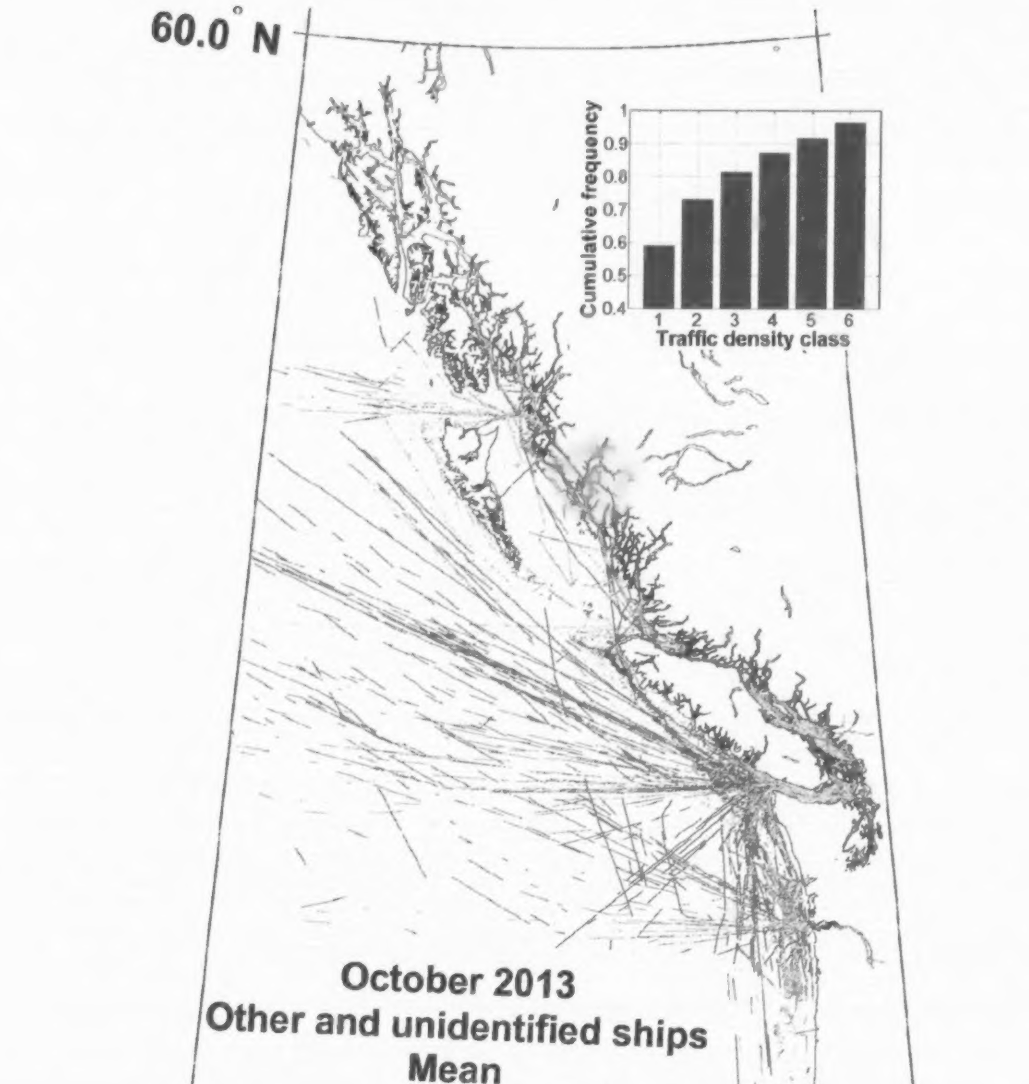

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 109410 km^2 ; 1342 ship-h d^{-1}

Figure 245. Map of AIS mean traffic density of other type of ships and ships of unidentified type in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

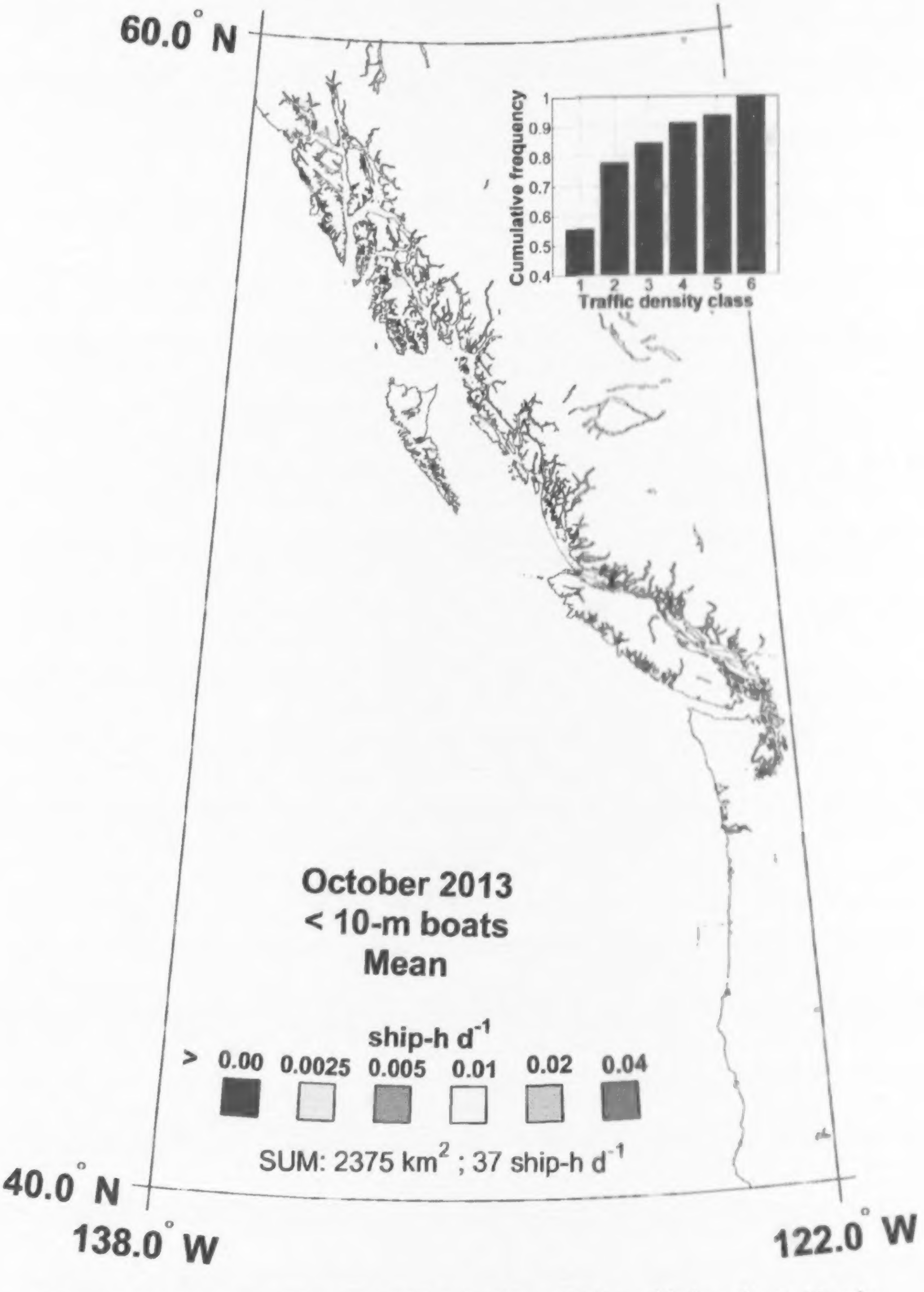

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 2375 km^2 ; 37 ship-h d^{-1}

Figure 246. Map of AIS mean traffic density of ships with lengths < 10 min October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

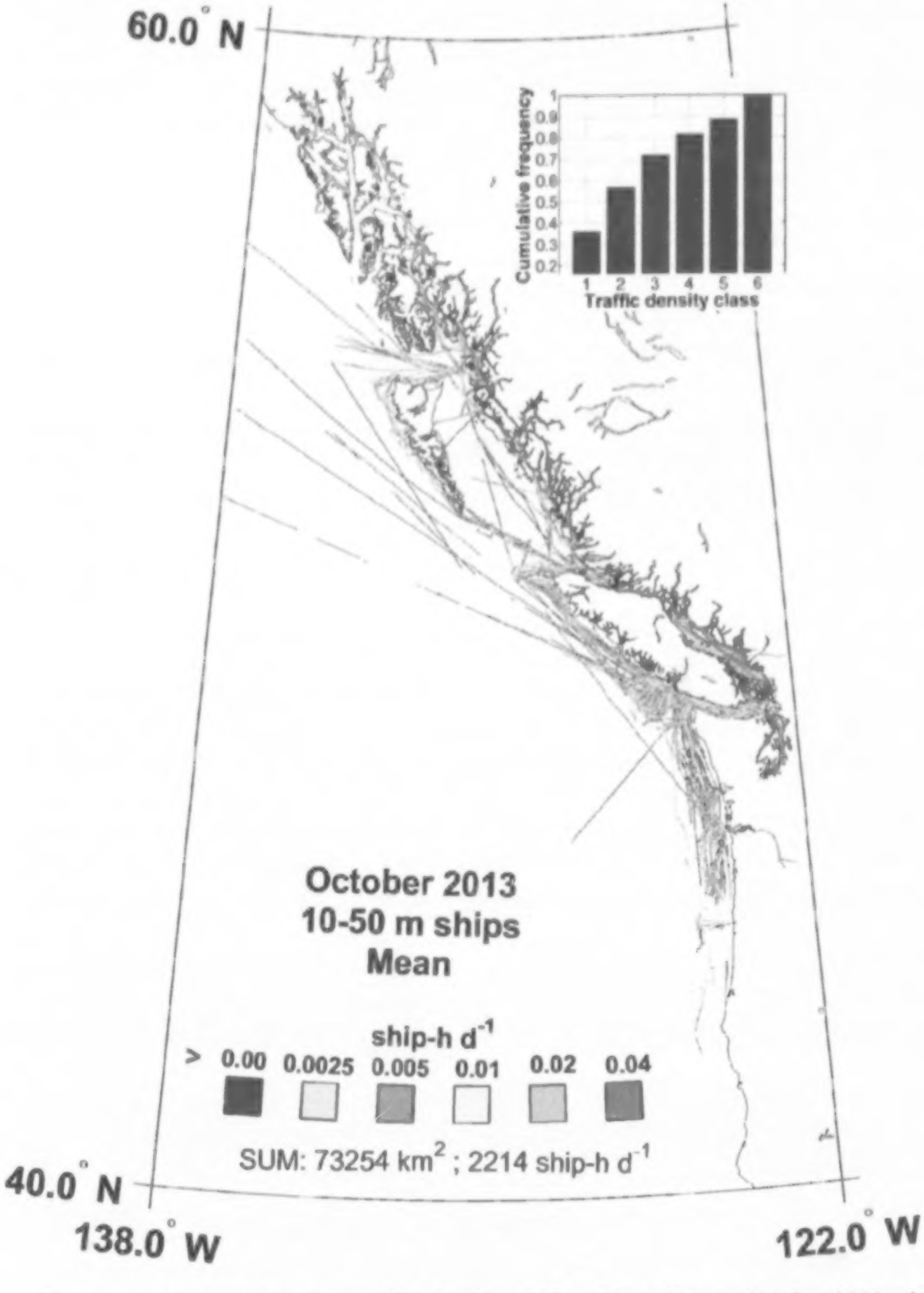

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
October 2013
10-50 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 73254 km² ; 2214 ship-h d⁻¹

Figure 247. Map of AIS mean traffic density of 10 to 50 m ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

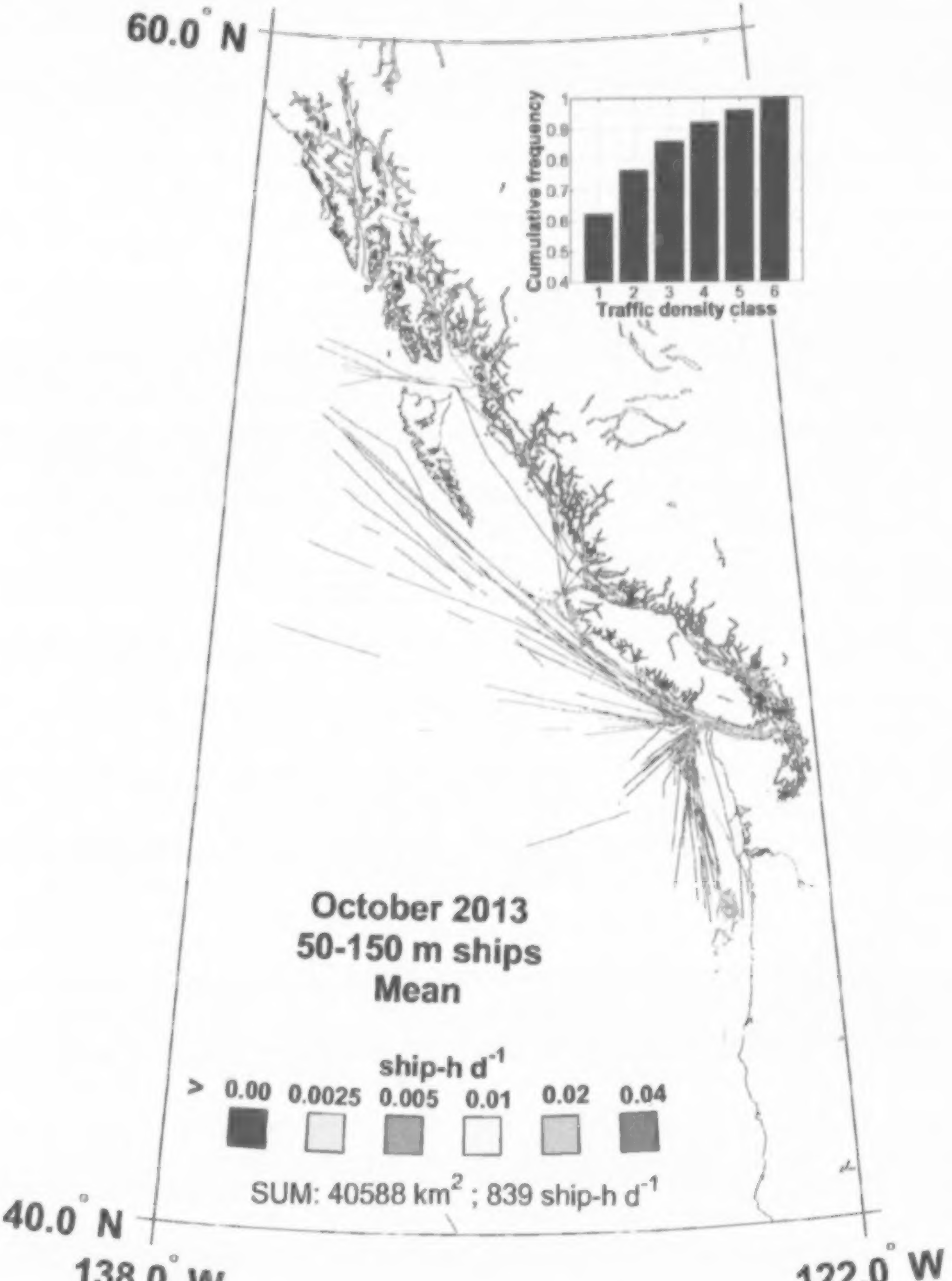

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
50-150 m ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 40588 km^2 ; 839 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 248. Map of AIS mean traffic density of 50 to 150 m ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

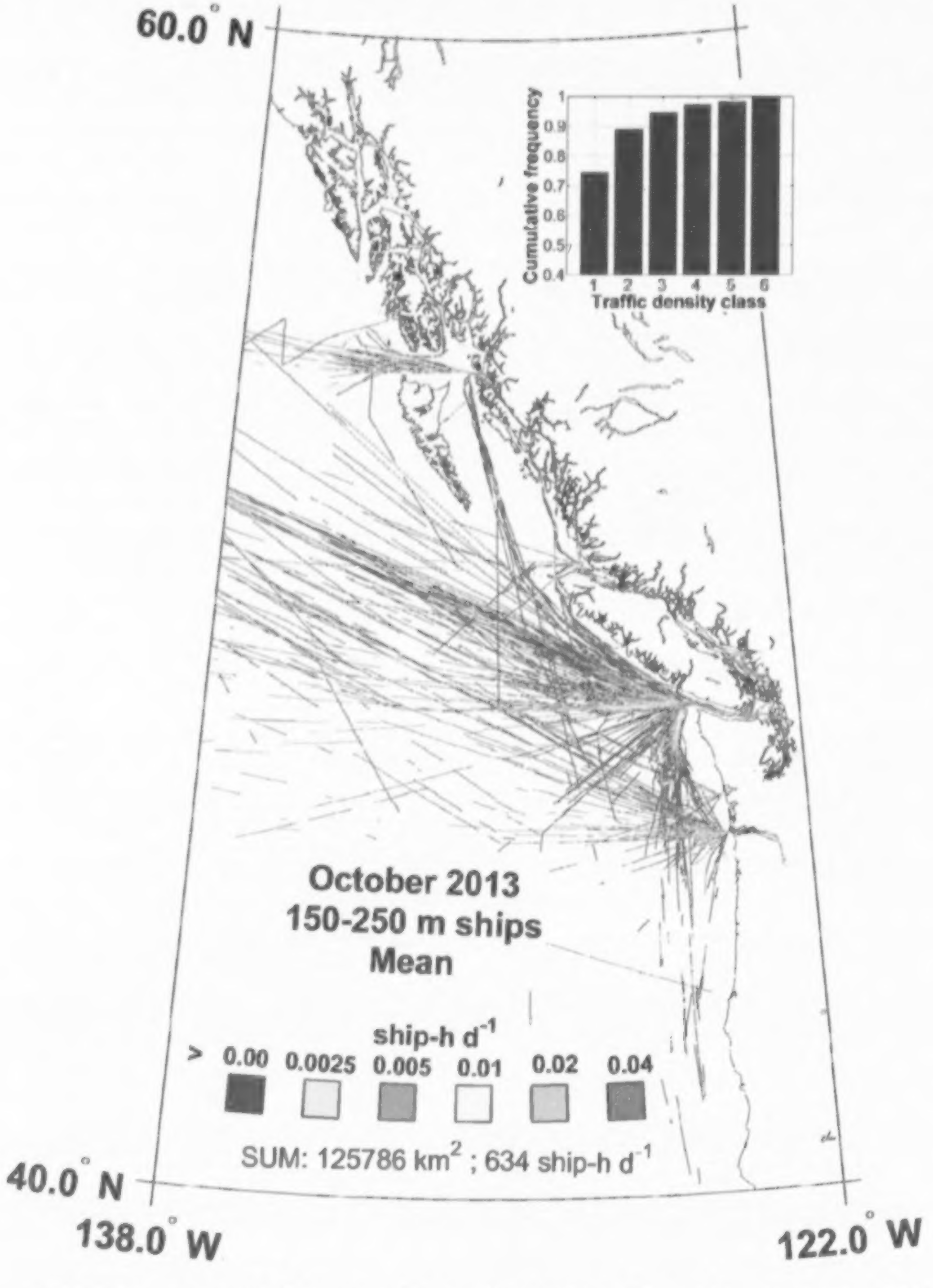

60.0° N
1
0.9
0.8
0.7
0.6
0.5
0.4
Cumulative frequency
1 2 3 4 5 6
Traffic density class
October 2013
150-250 m ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 125786 km2 ; 634 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 249. Map of AIS mean traffic density of 150 to 250 m ships in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

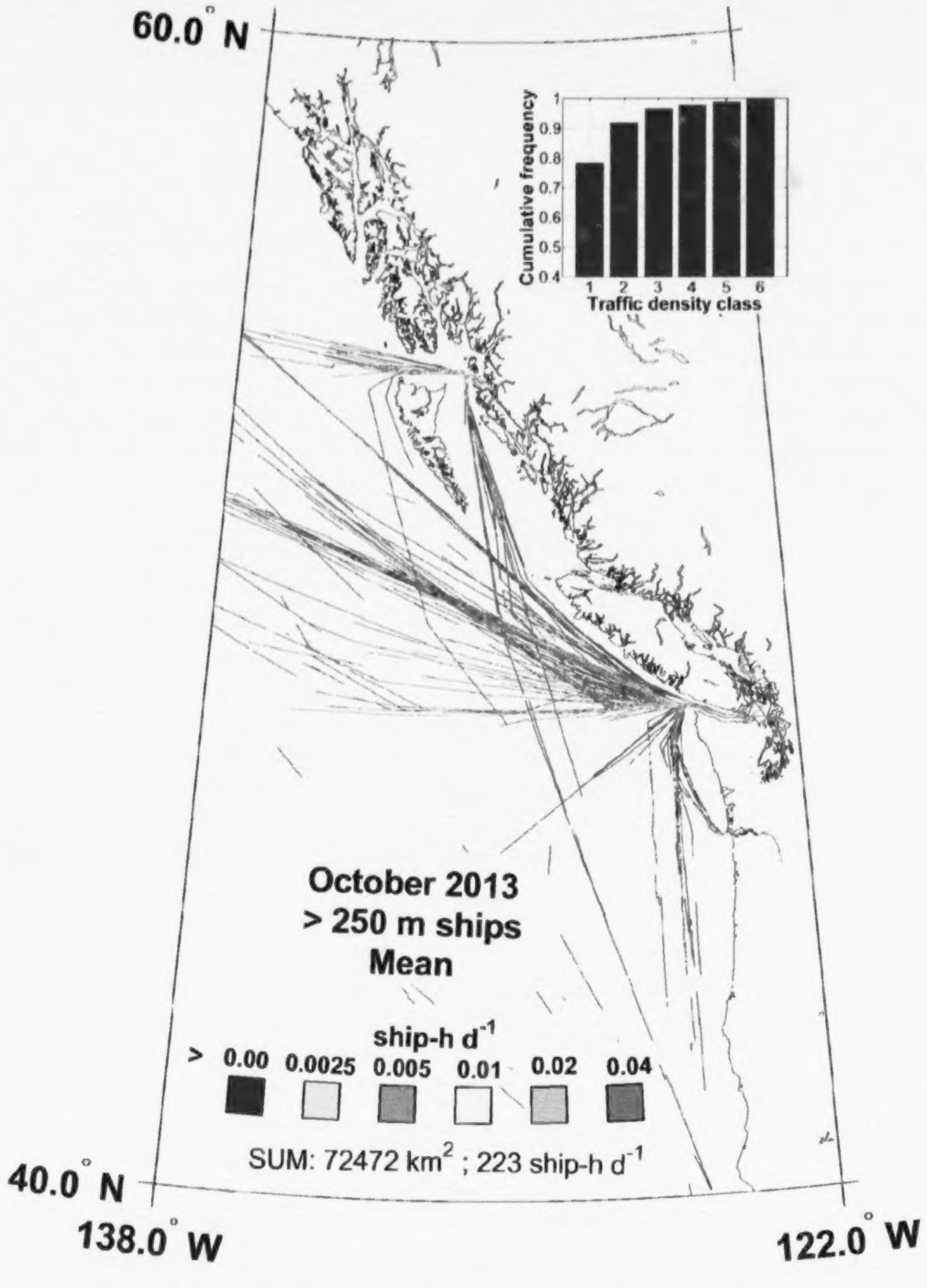

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
> 250 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 72472 km² ; 223 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 250. Map of >250 m ship AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

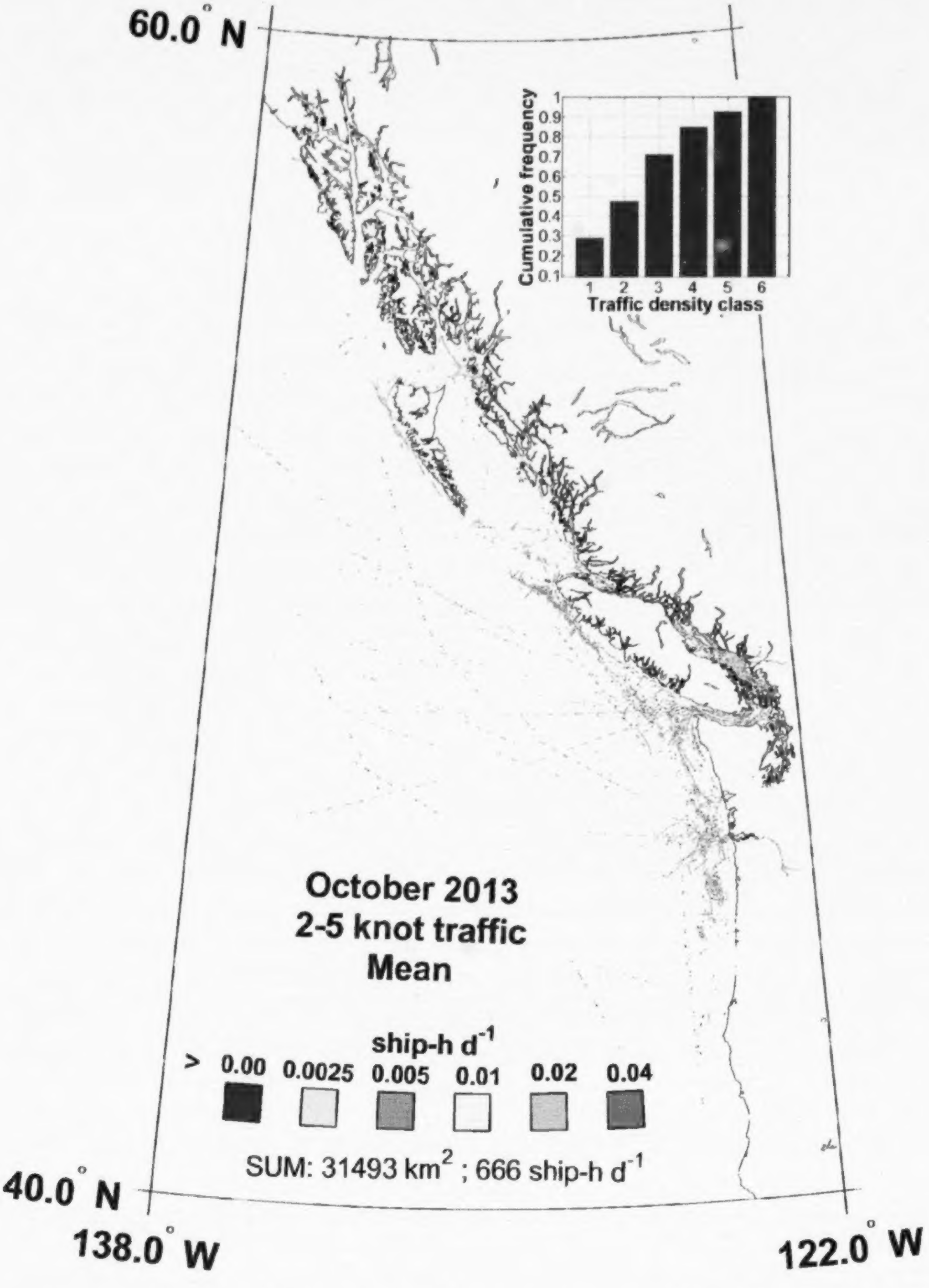

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
October 2013
2-5 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 31493 km^2 ; 666 ship-h d^{-1}

Figure 251. Map of 2–5 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

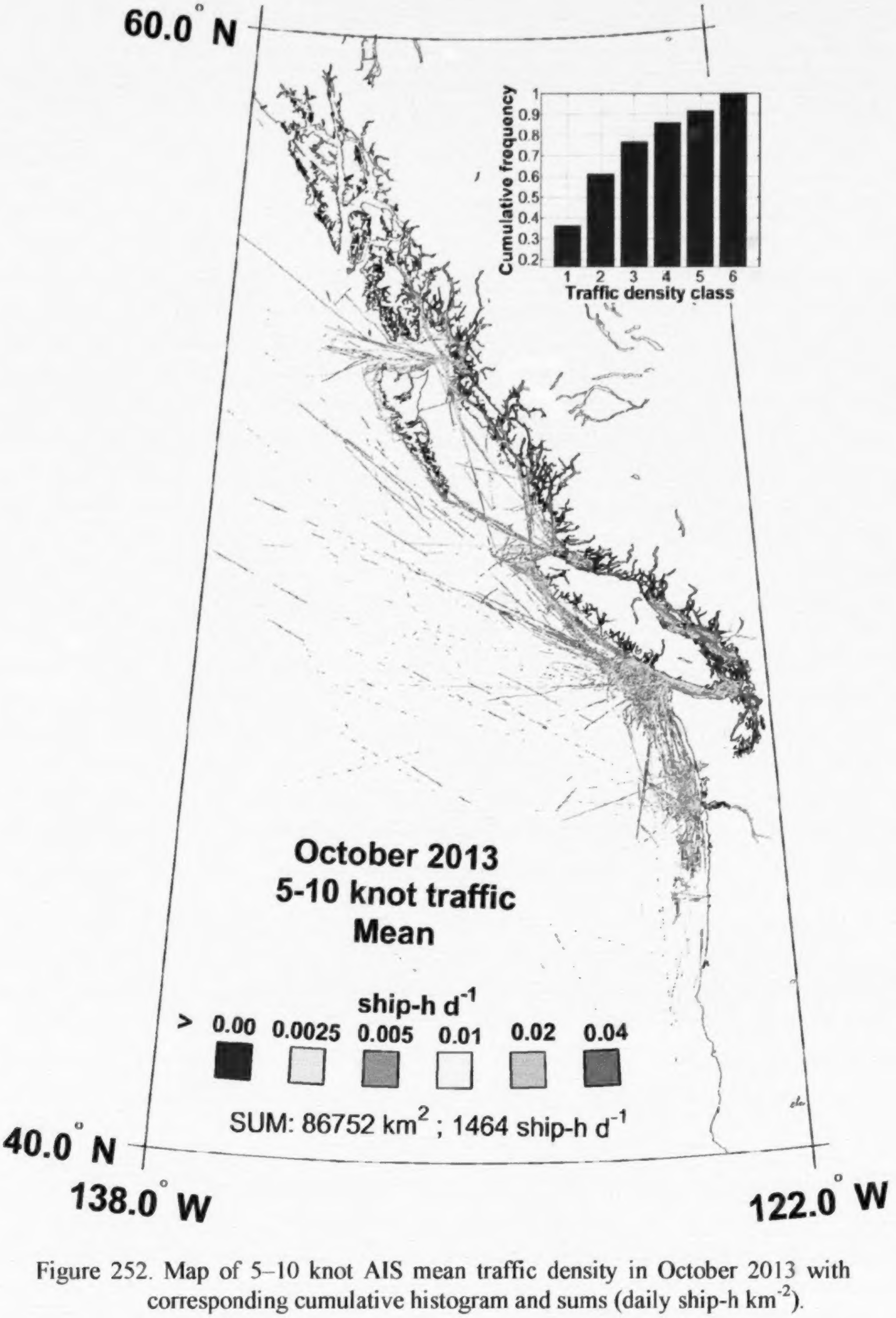

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
1 2 3 4 5 6
Traffic density class
October 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 86752 km^2 ; 1464 ship-h d^{-1}

Figure 252. Map of 5–10 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

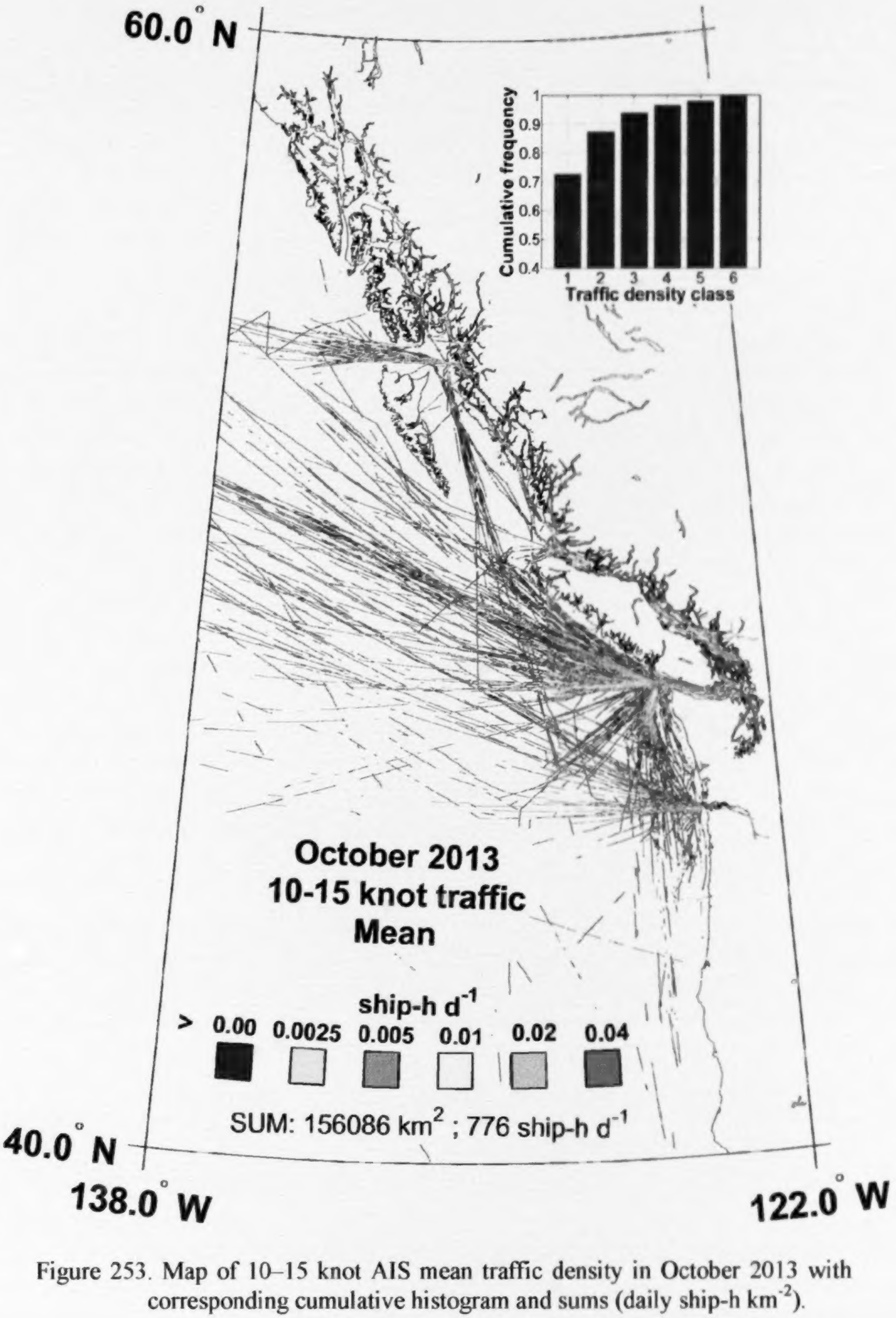

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 156086 km^2 ; 776 ship-h d^{-1}

Figure 253. Map of 10–15 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

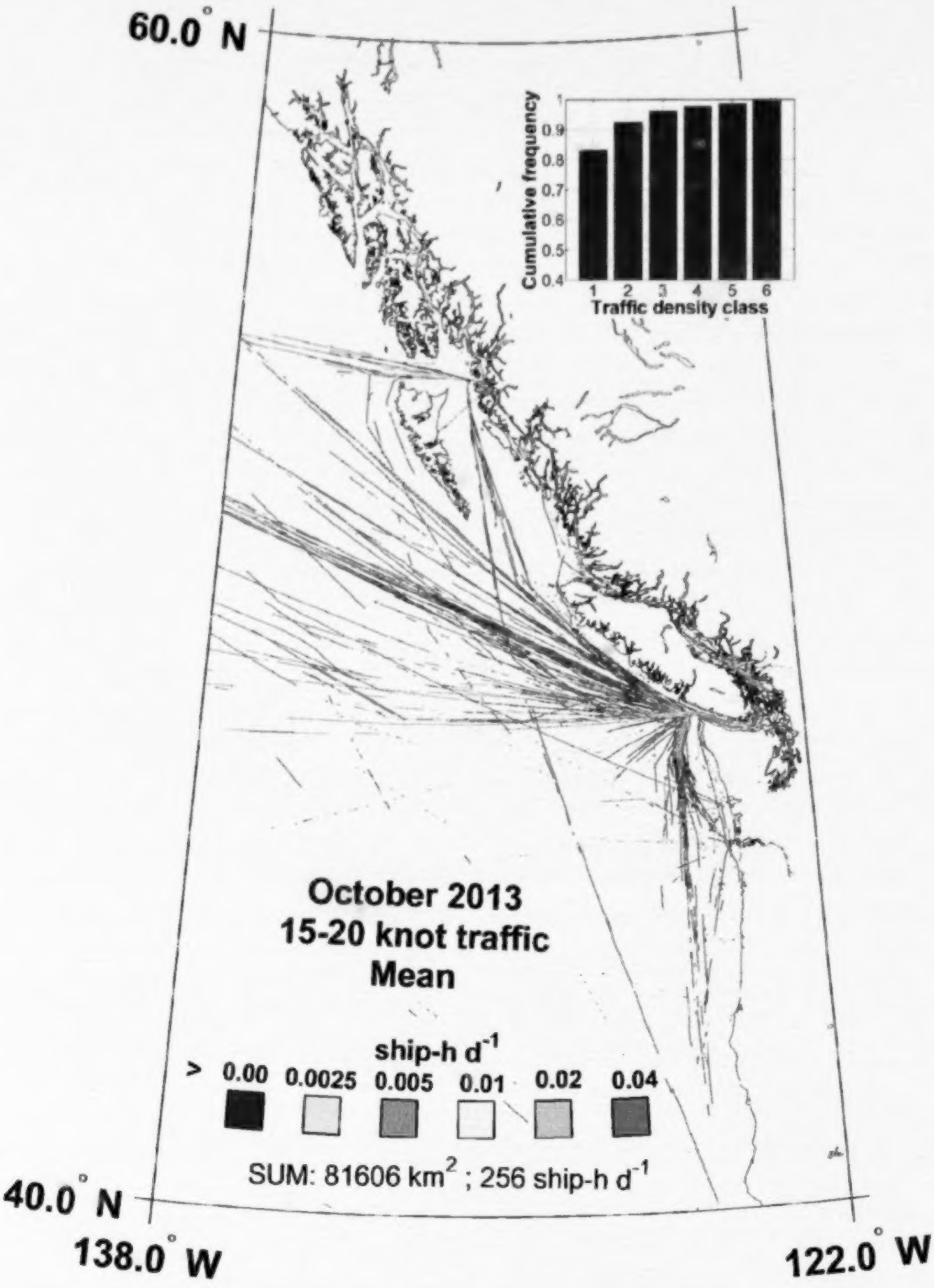

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 81606 km^2 ; 256 ship-h d^{-1}

Figure 254. Map of 15–20 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

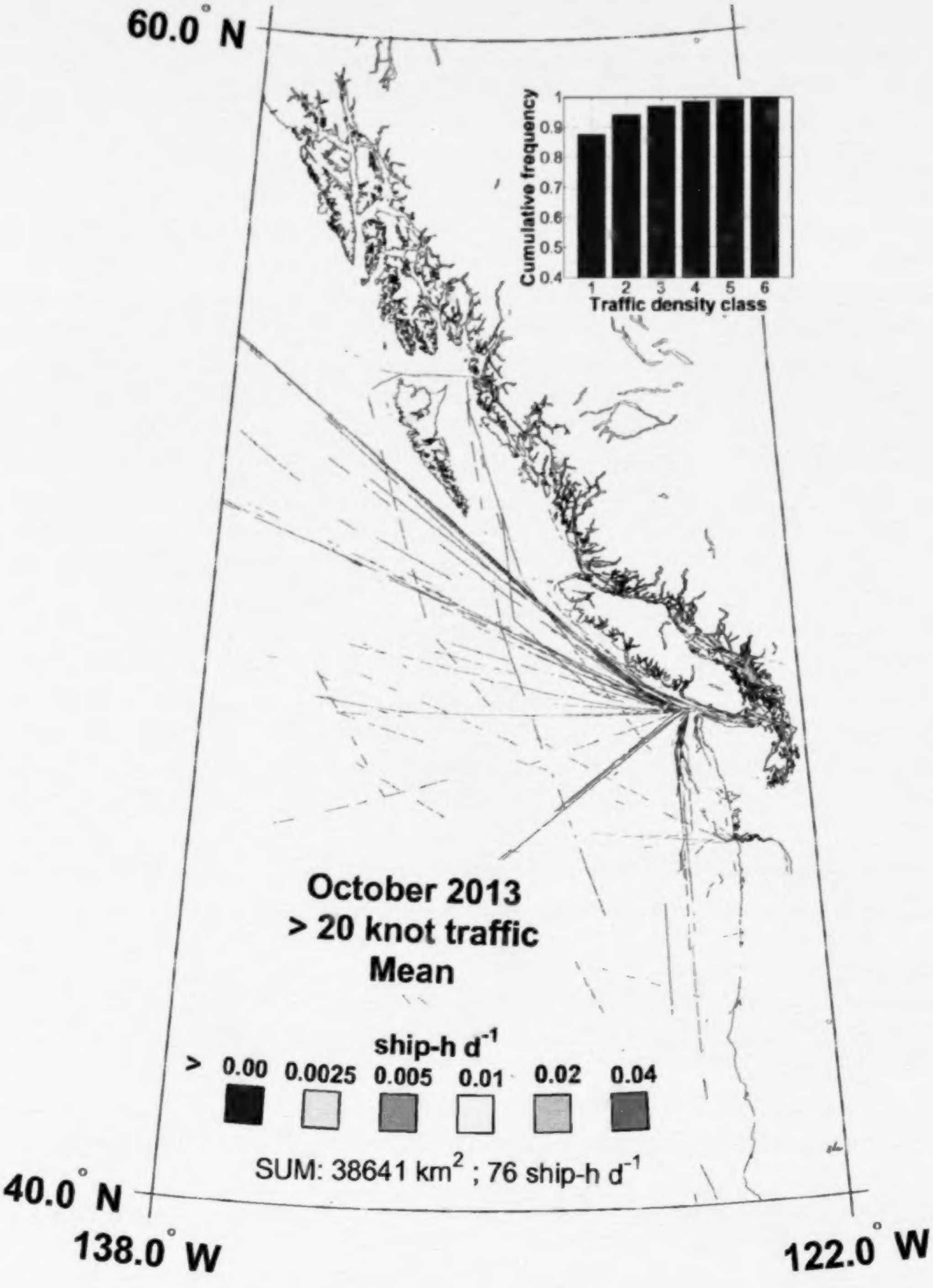

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
October 2013
> 20 knot traffic
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 38641 km^2 ; 76 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 255. Map of >20 knot AIS mean traffic density in October 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.11. November 2013

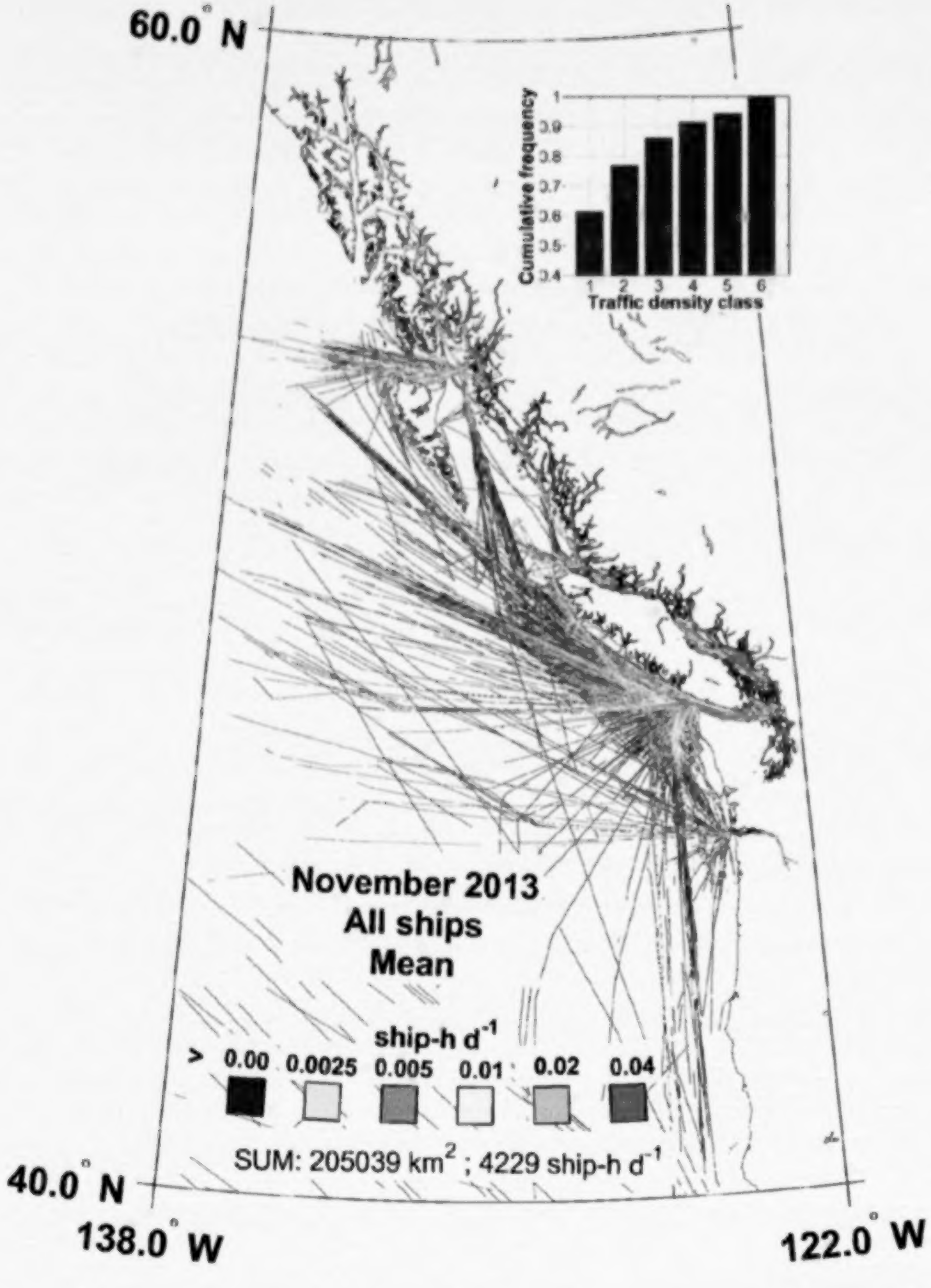

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
All ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 205039 km^2 ; 4229 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 256. Map of AIS mean traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

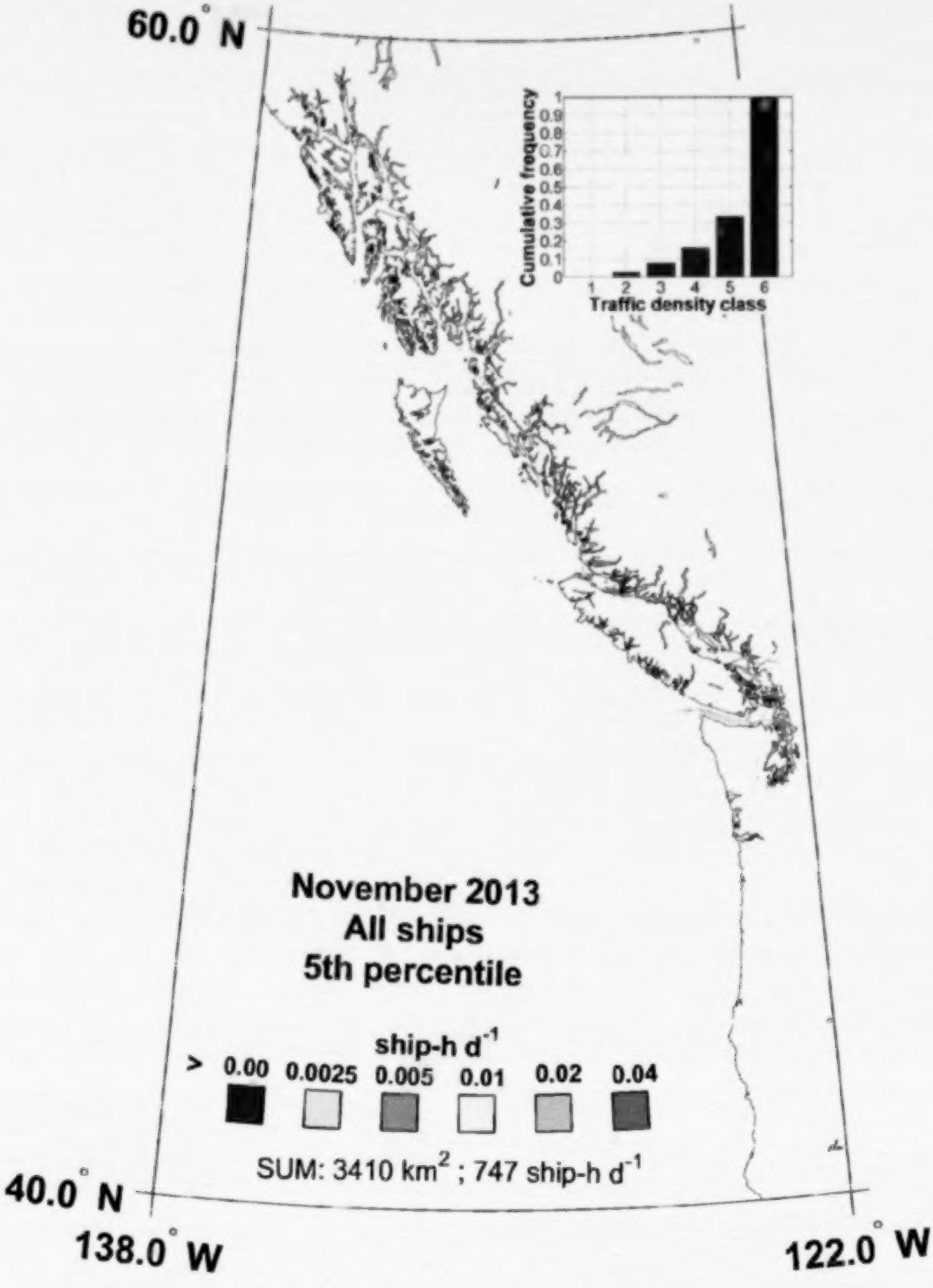

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
November 2013
All ships
5th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 3410 km2 ; 747 ship-h d-1

Figure 257. Map of the 5th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

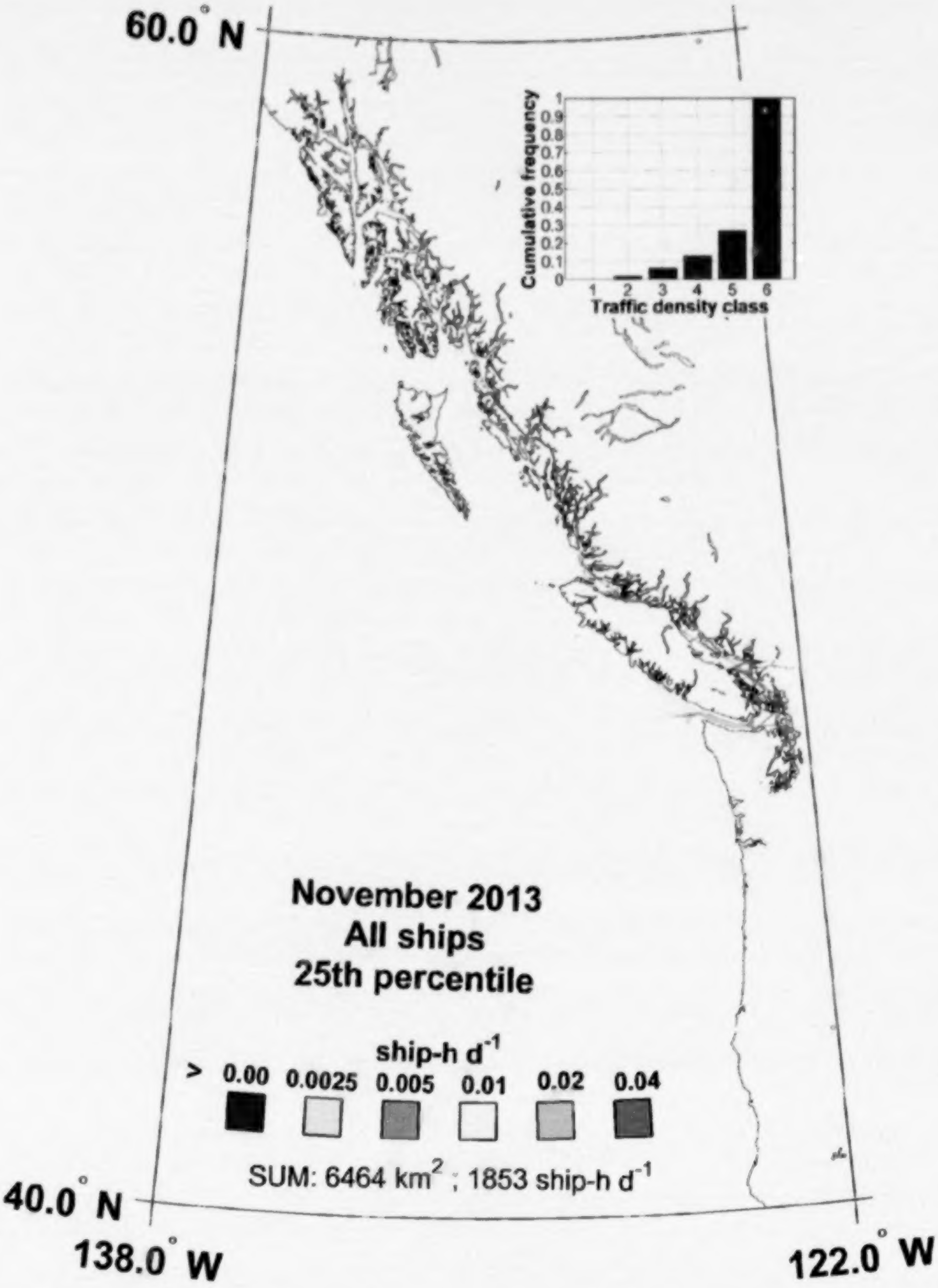

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
November 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 6464 km^2 ; 1853 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 258. Map of the 25th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

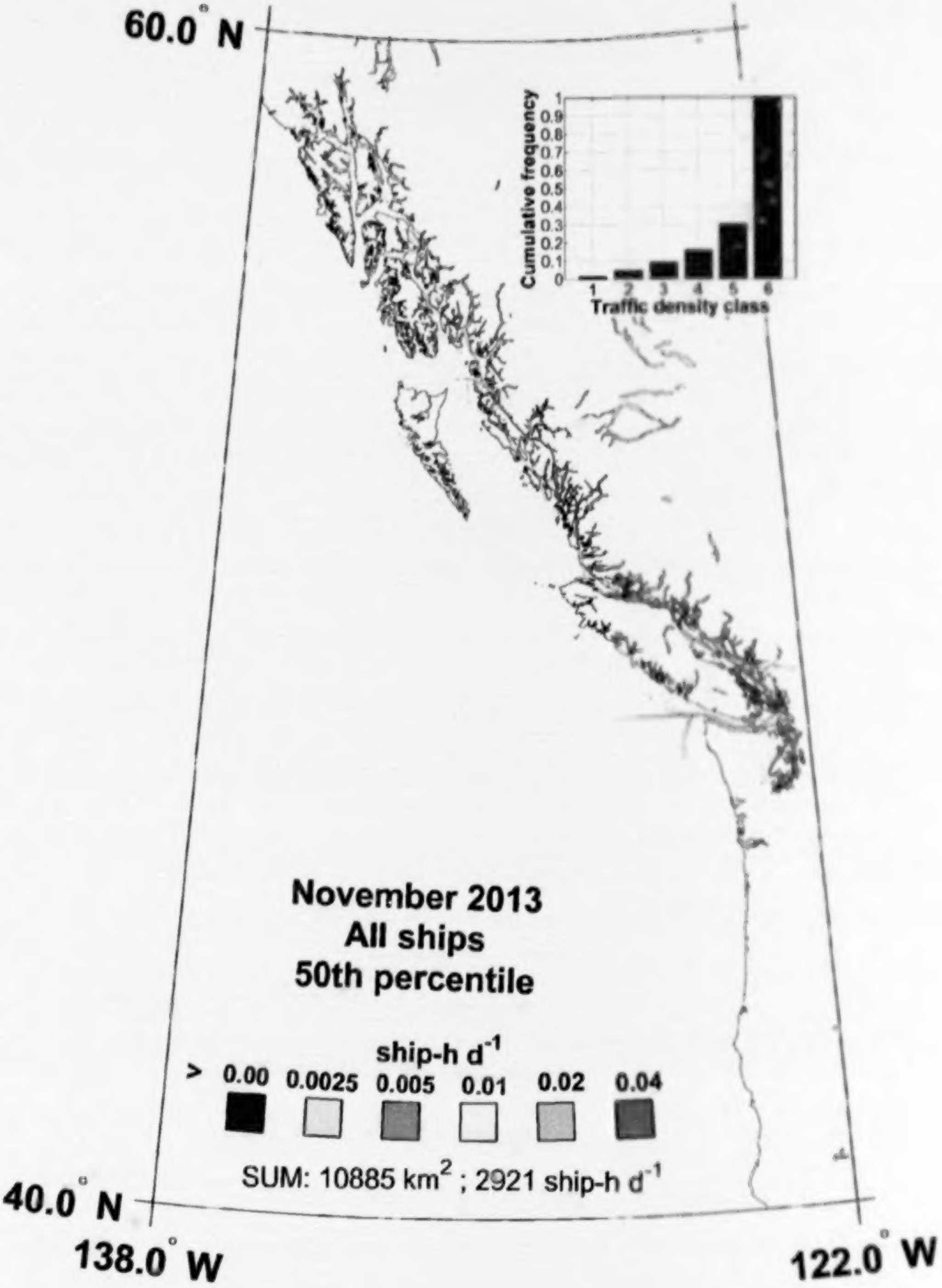

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
Traffic density class
November 2013
All ships
50th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 10885 km2 ; 2921 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 259. Map of the 50th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

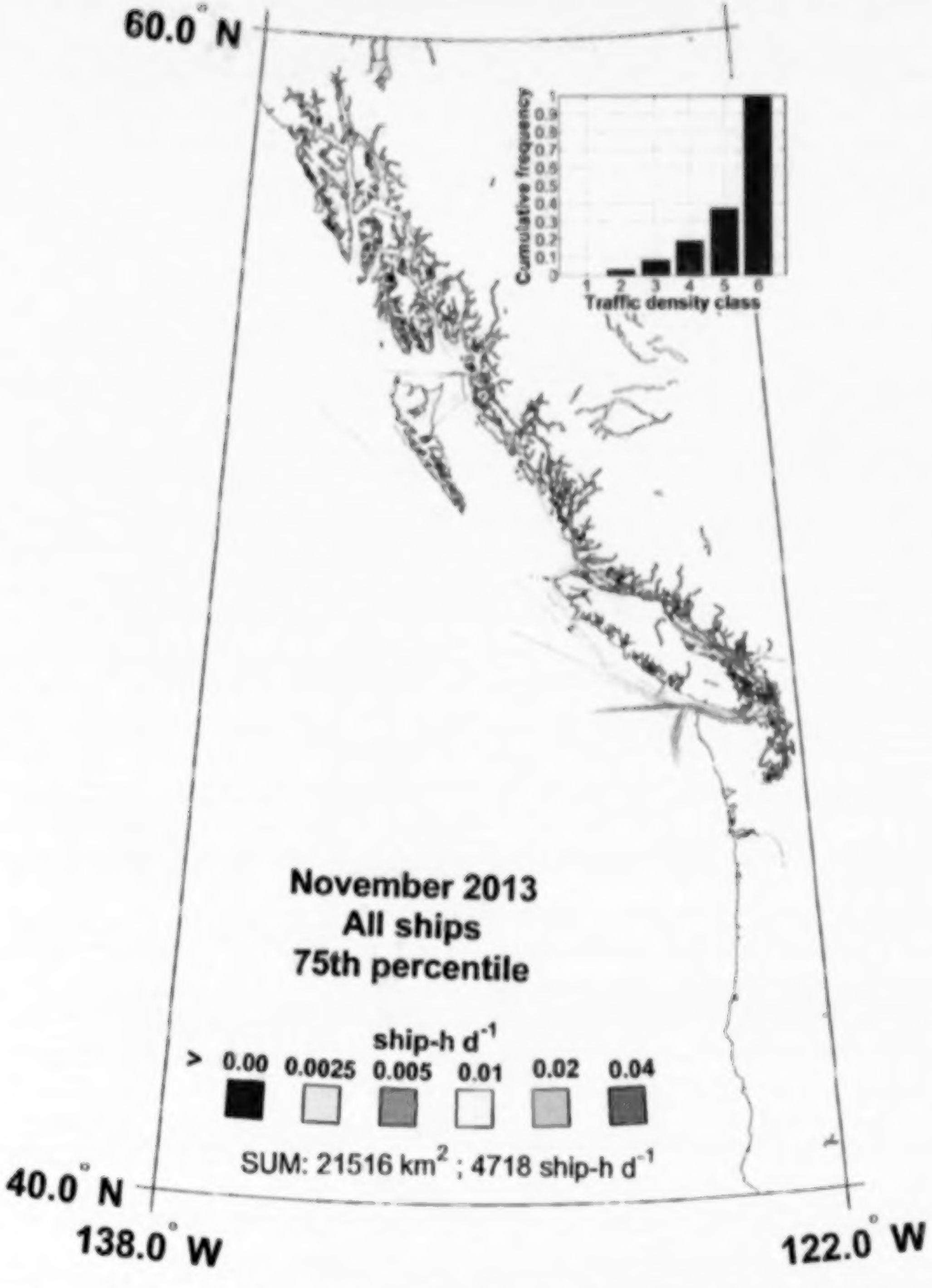

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
November 2013
All ships
75th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 21516 km2 ; 4718 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 260. Map of the 75th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

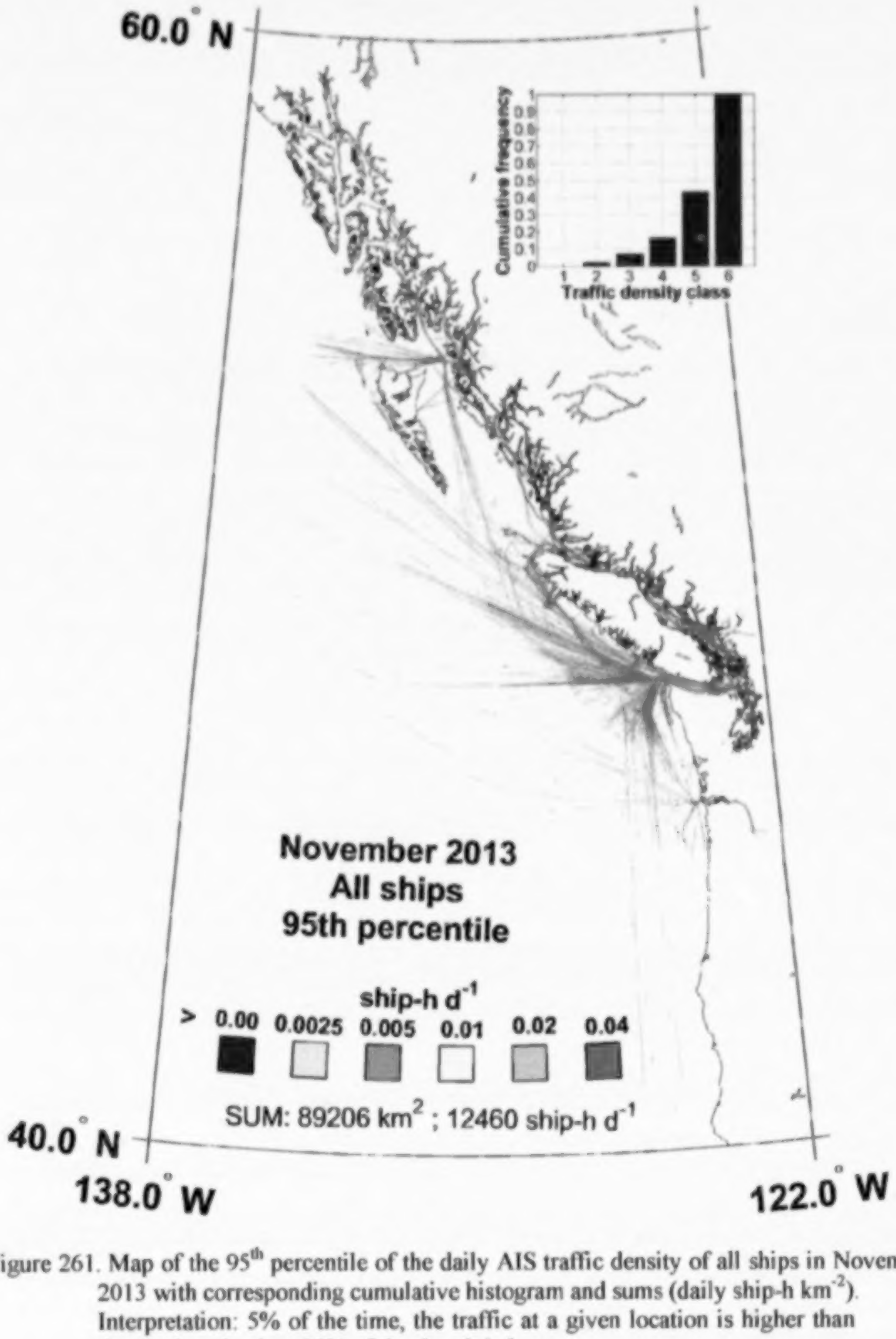

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
November 2013
All ships
95th percentile
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 89206 km² ; 12460 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 261. Map of the 95th percentile of the daily AIS traffic density of all ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

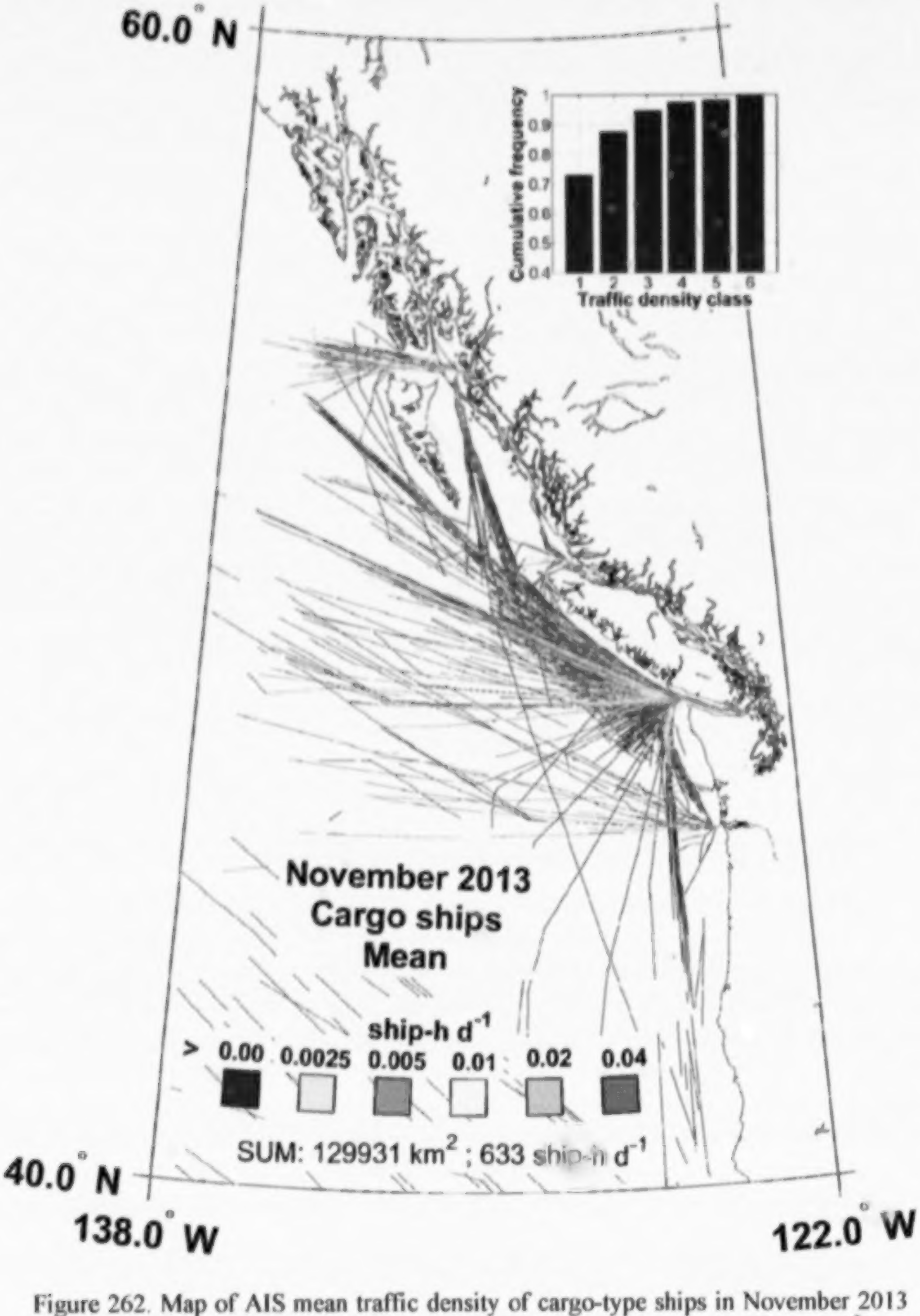

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
Cargo ships
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 129931 km2 ; 633 ship-h d-1

Figure 262. Map of AIS mean traffic density of cargo-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).
]

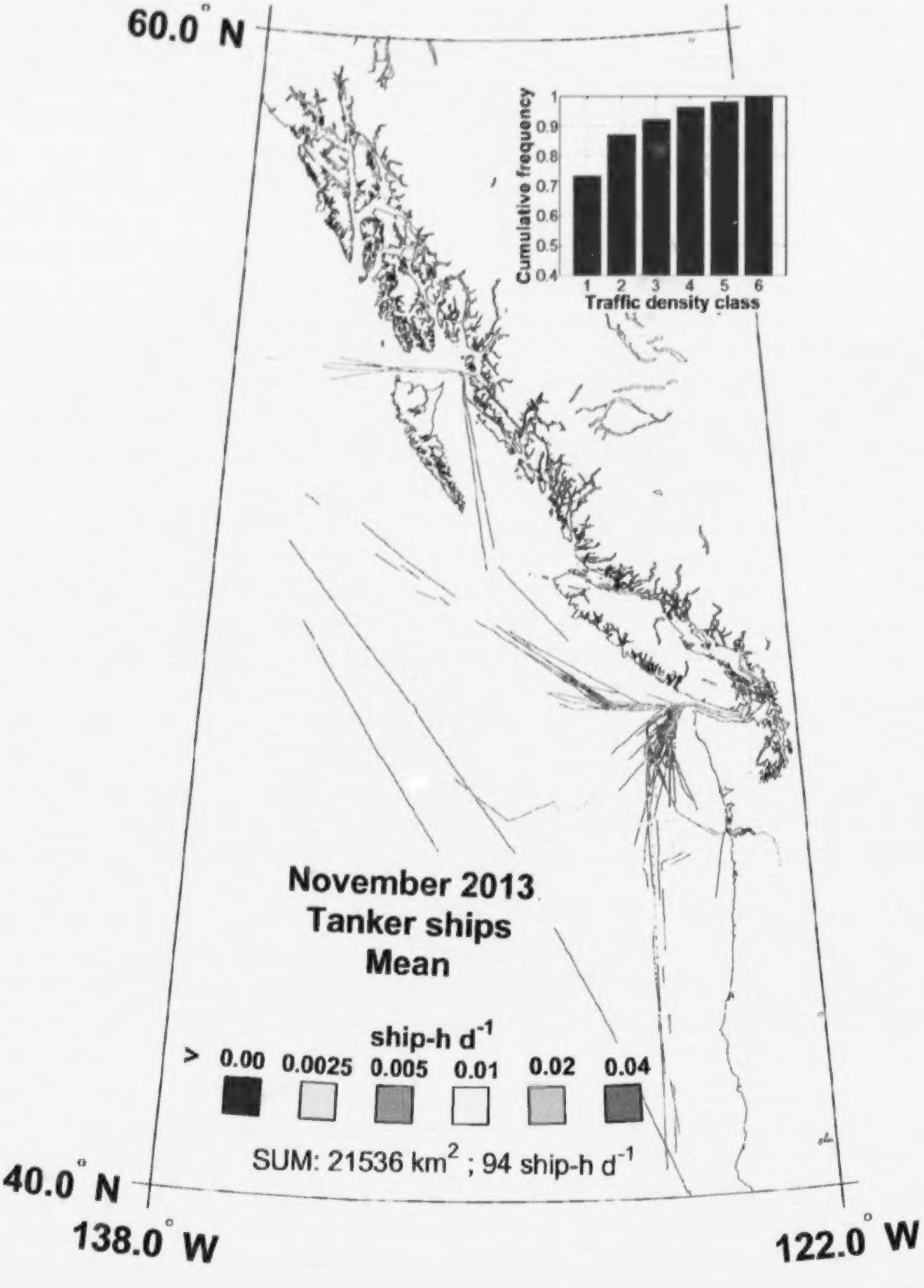

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 21536 km^2 ; 94 ship-h d^{-1}

Figure 263. Map of AIS mean traffic density of tanker-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

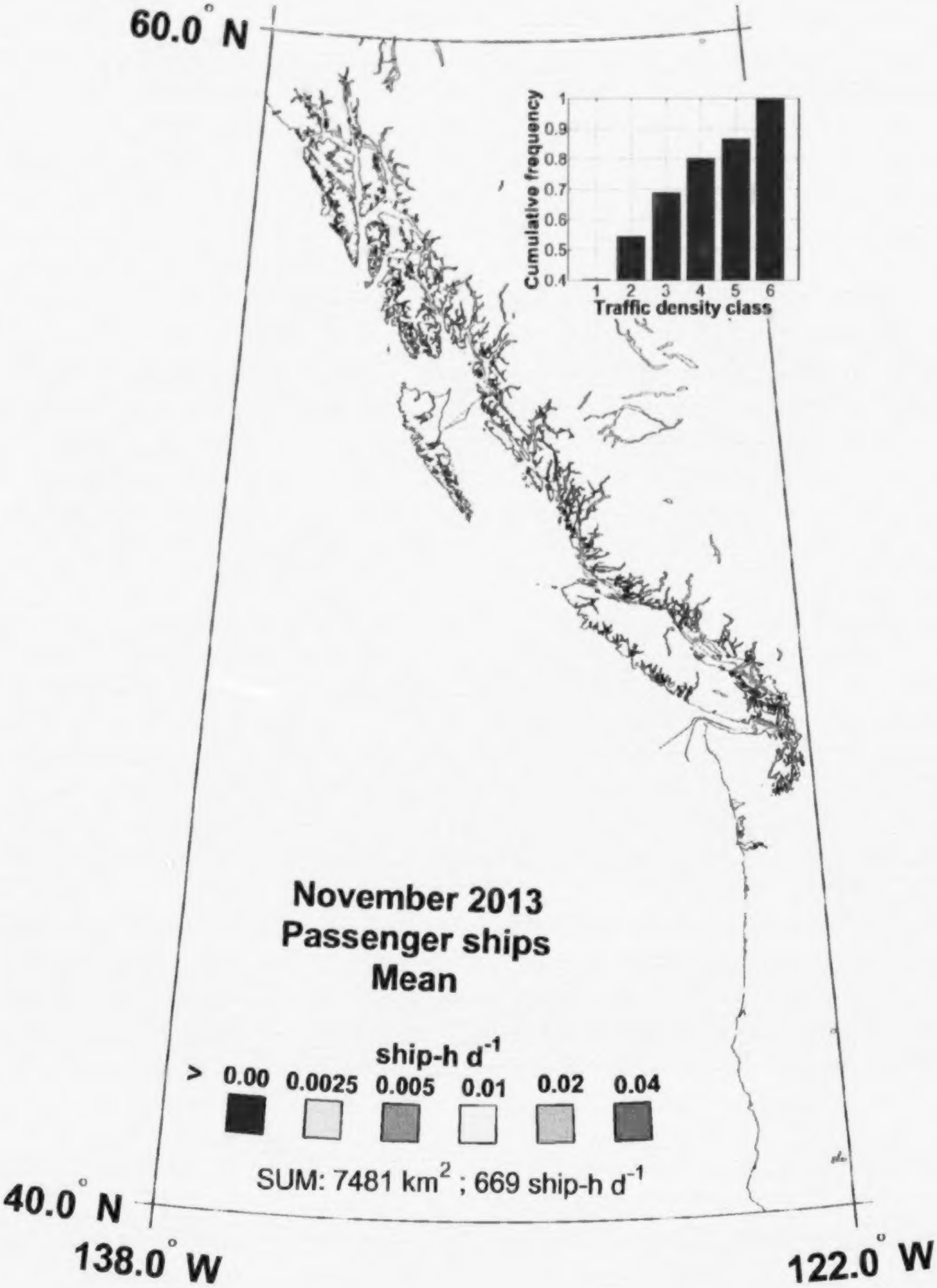

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
November 2013
Passenger ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7481 km² ; 669 ship-h d⁻¹

Figure 264. Map of AIS mean traffic density of passenger-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

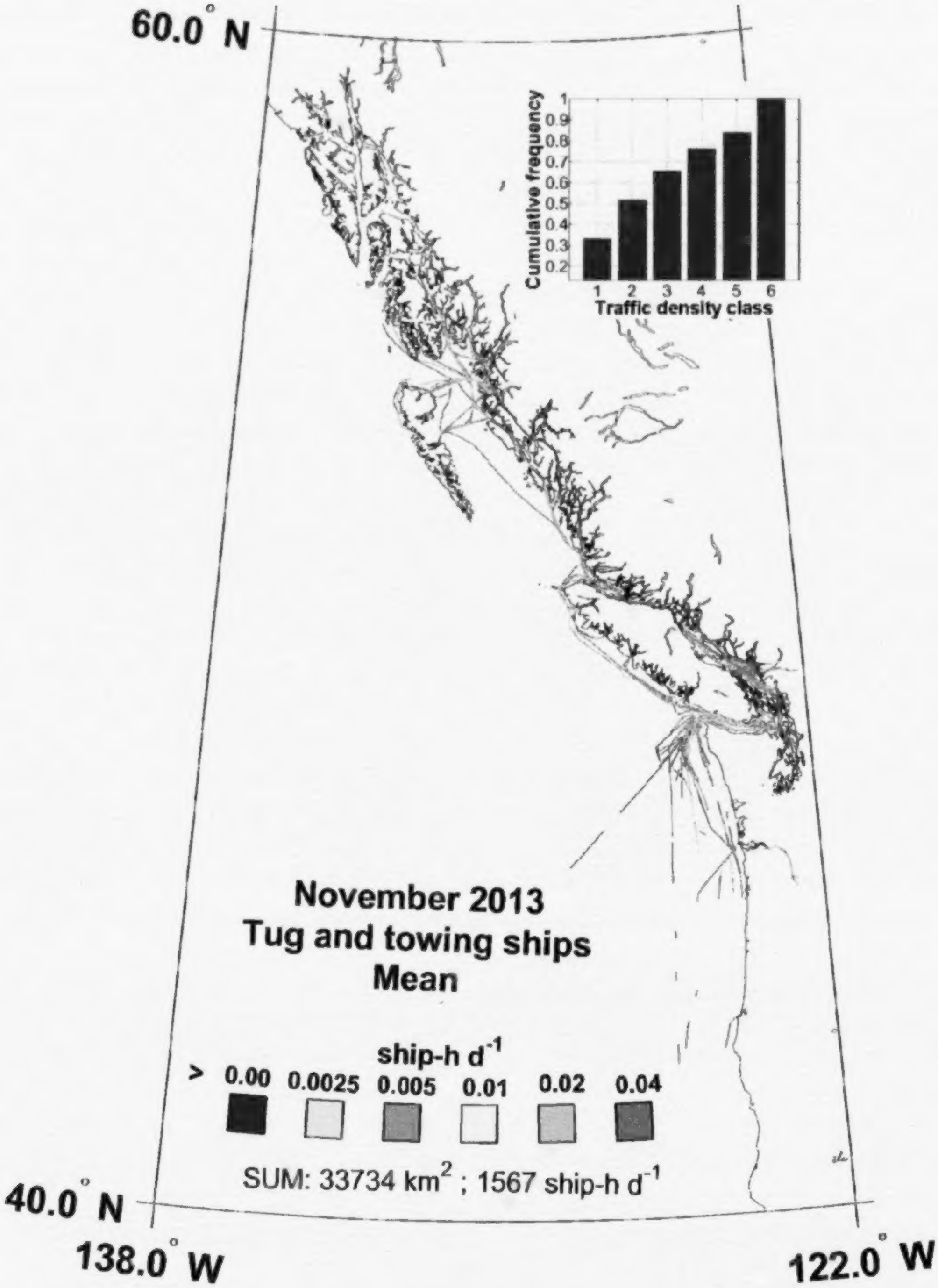

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
November 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 33734 km^2 ; 1567 ship-h d^{-1}

Figure 265. Map of AIS mean traffic density of tug and towing -type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

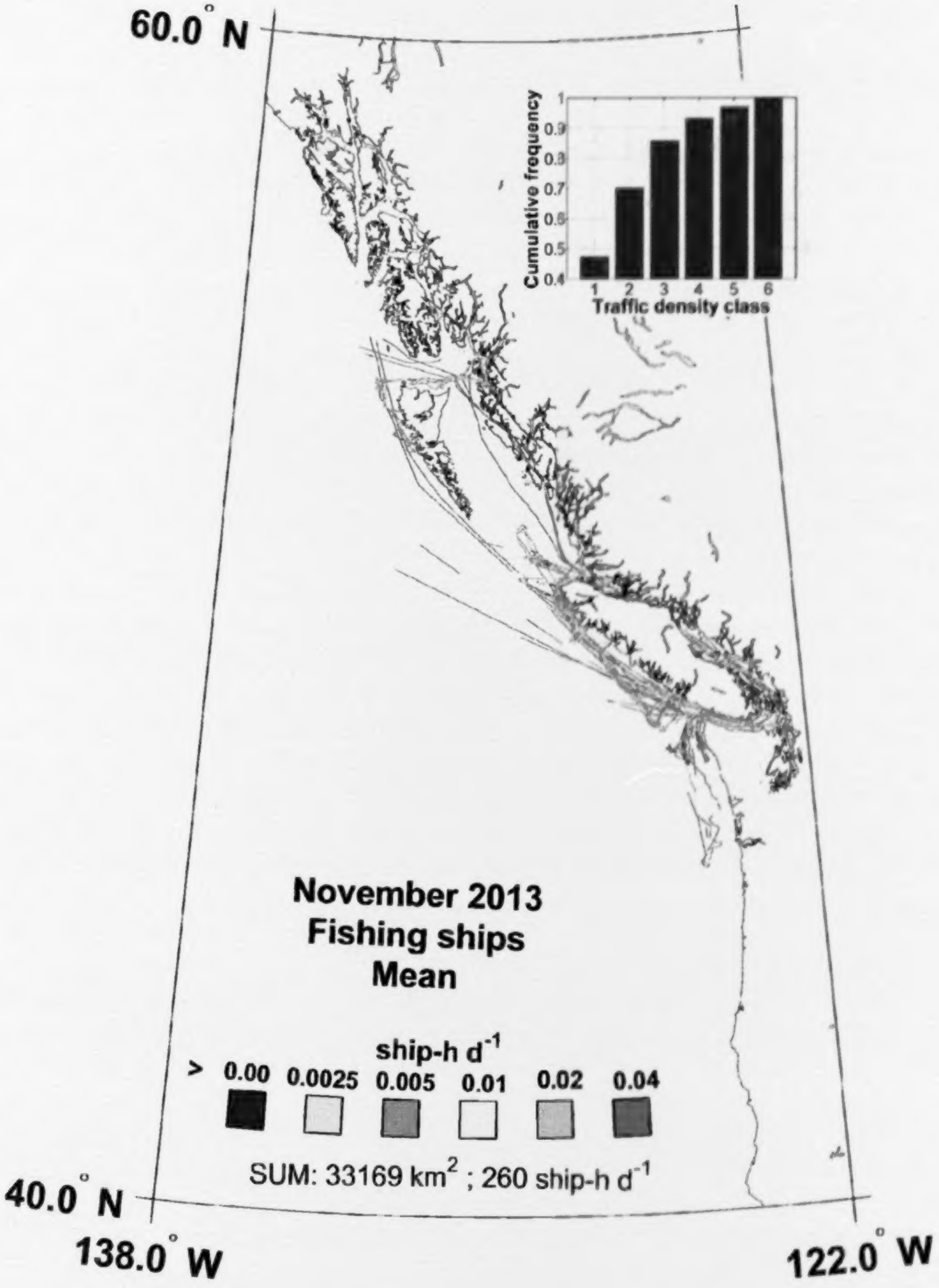

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
Fishing ships
Mean
ship-h d⁻¹
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 33169 km² ; 260 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 266. Map of AIS mean traffic density of fishing-type ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

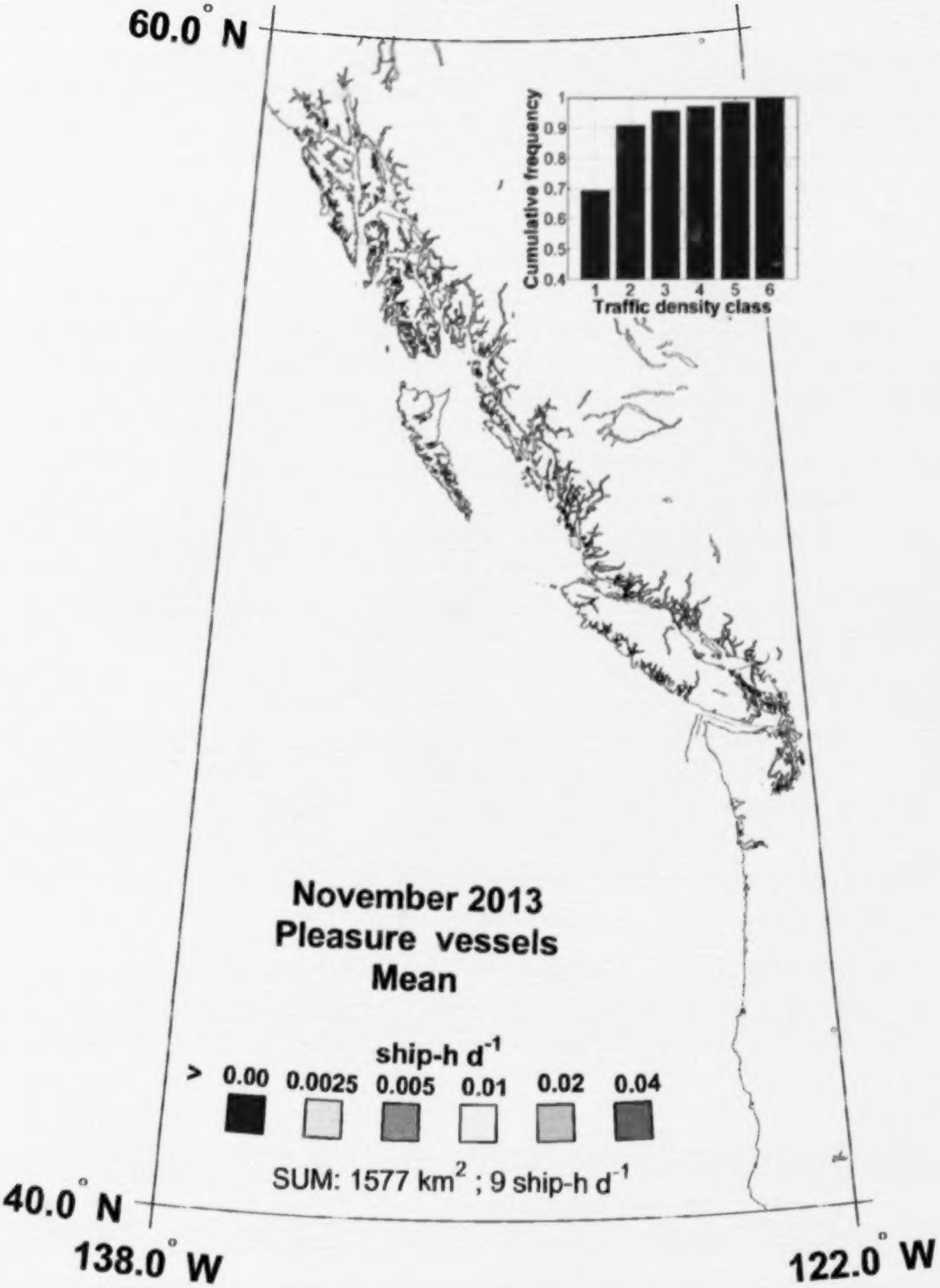

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 1577 km^2 ; 9 ship-h d^{-1}

Figure 267. Map of AIS mean traffic density of pleasure-type vessels in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

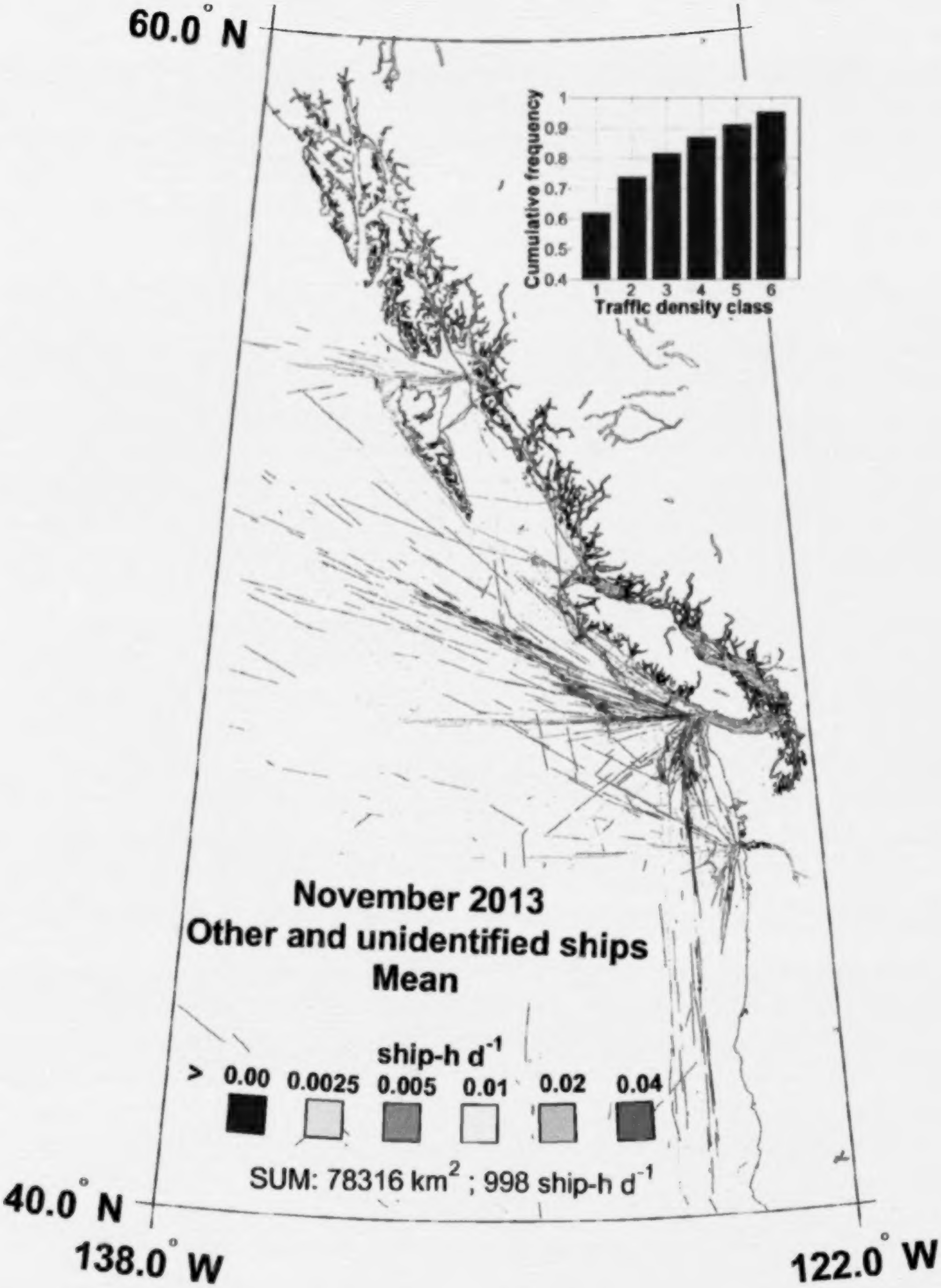

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
Other and unidentified ships
Mean
ship-h d^{-1}
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 78316 km^2 ; 998 ship-h d^{-1}

Figure 268. Map of AIS mean traffic density of other type of ships and ships of unidentified type in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

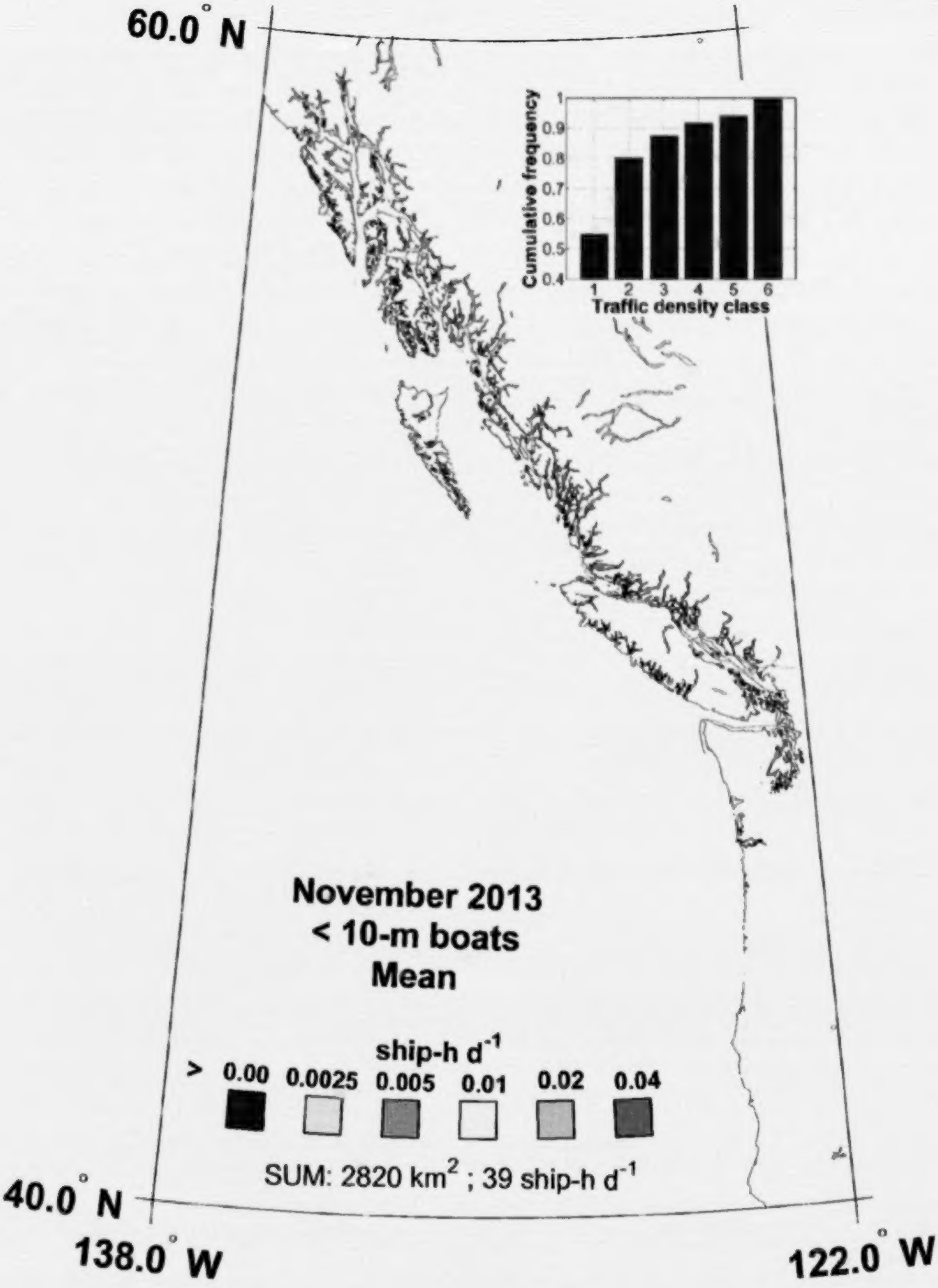

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 2820 km^2 ; 39 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 269. Map of AIS mean traffic density of ships with lengths < 10 min November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

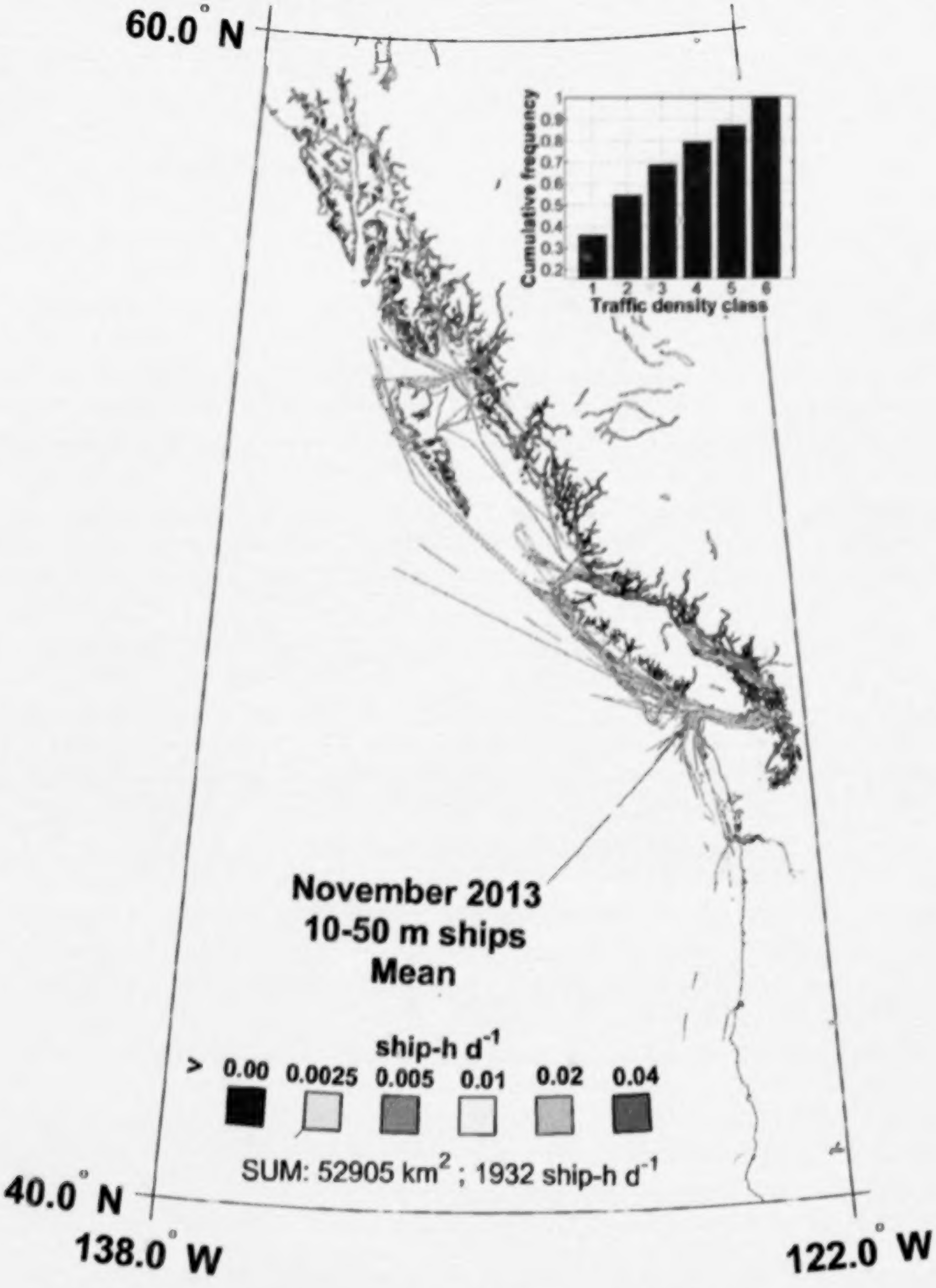

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
November 2013
10-50 m ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 52905 km2 ; 1932 ship-h d-1

Figure 270. Map of AIS mean traffic density of 10 to 50 m ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

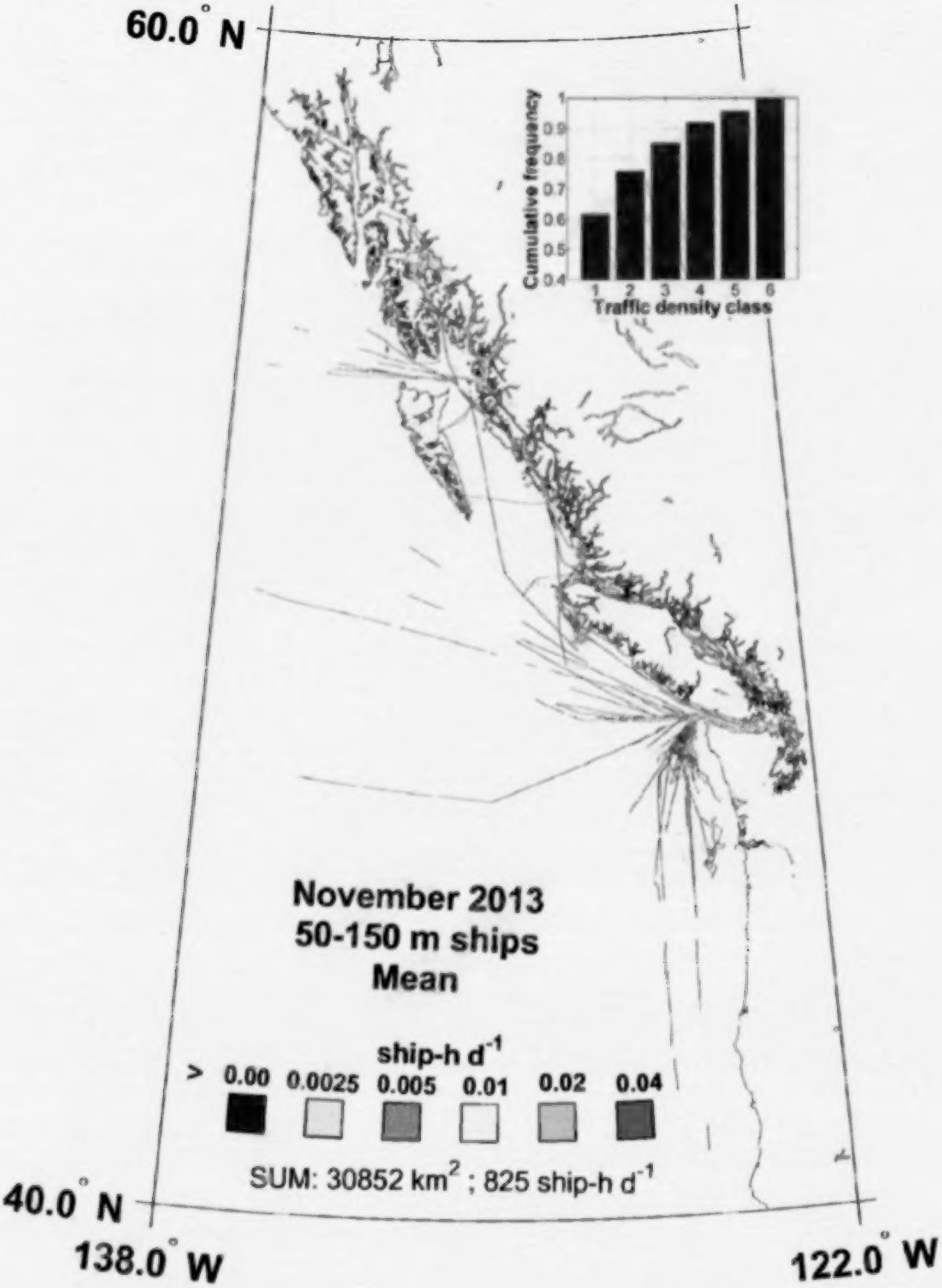

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
50-150 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 30852 km^2 ; 825 ship-h d^{-1}

Figure 271. Map of AIS mean traffic density of 50 to 150 m ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

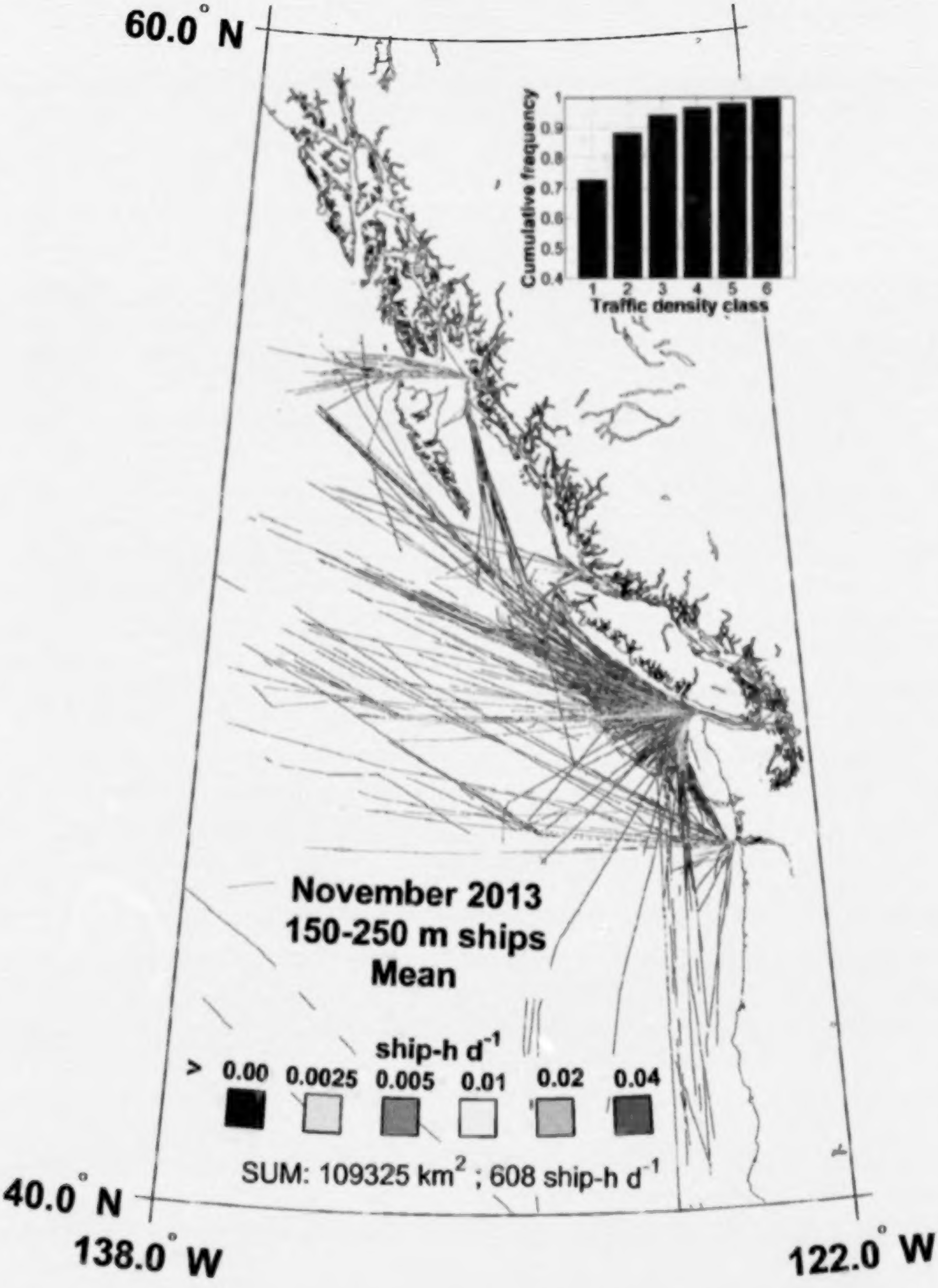

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
150-250 m ships
Mean
ship-h d^-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 109325 km^2 ; 608 ship-h d^-1
40.0° N
138.0° W
122.0° W

Figure 272. Map of AIS mean traffic density of 150 to 250 m ships in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

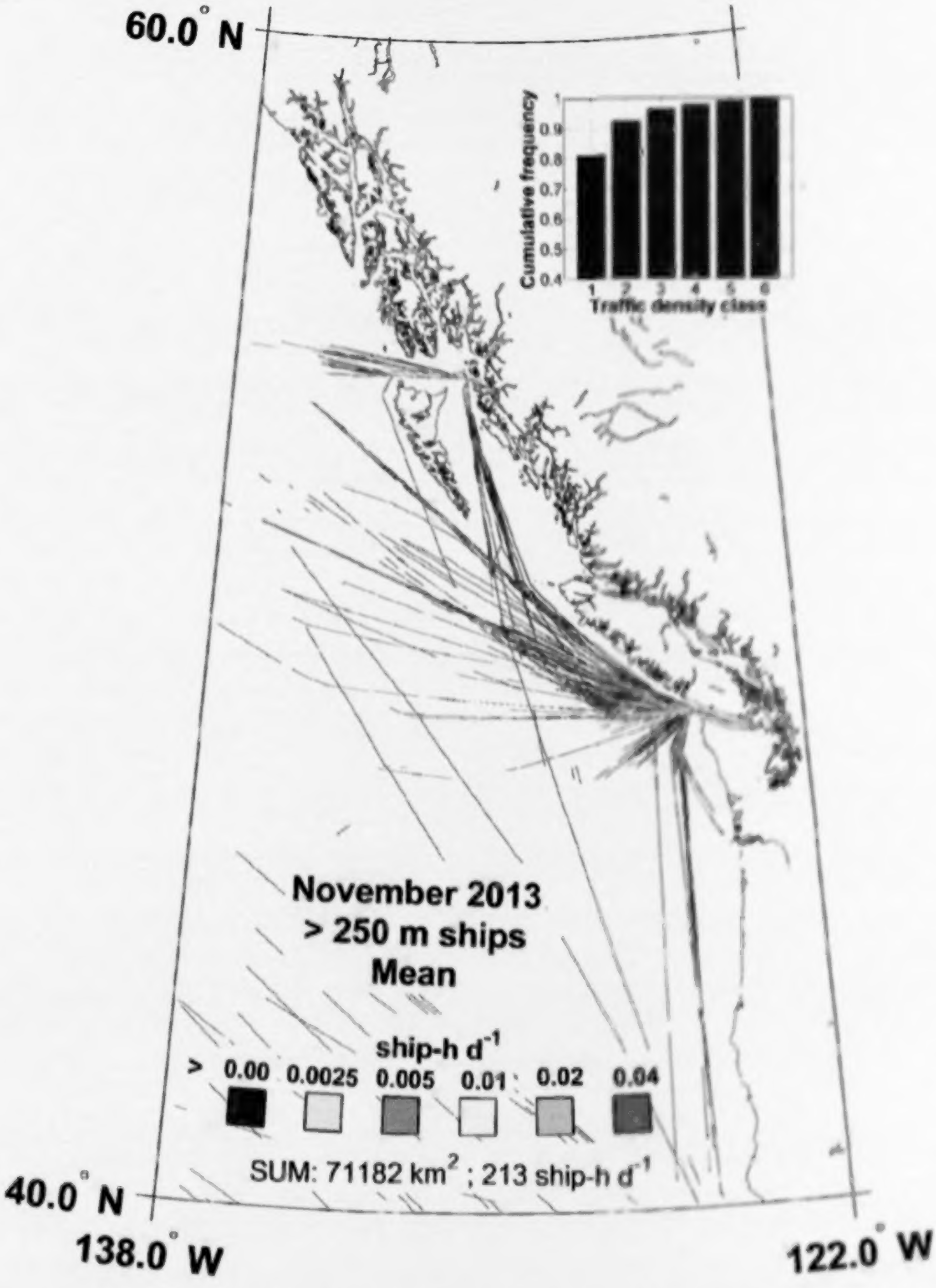

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
> 250 m ships
Mean
ship-h d-1
> 0.00 0.0025 0.005 0.01 0.02 0.04
SUM: 71182 km2 ; 213 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 273. Map of >250 m ship AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

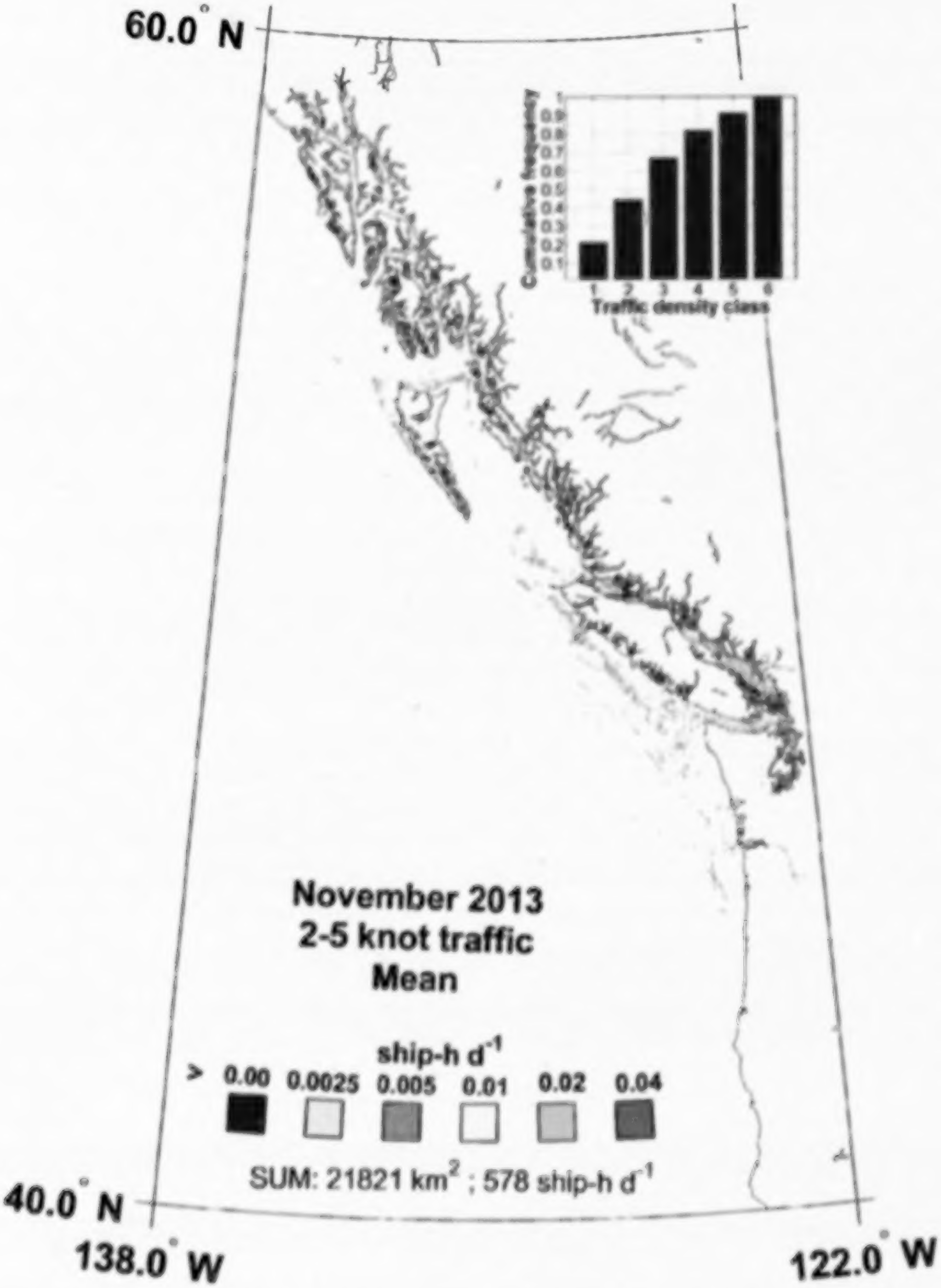

60.0° N
Cumulative frequency
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
November 2013
2-5 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 21821 km^2 ; 578 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 274. Map of 2–5 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

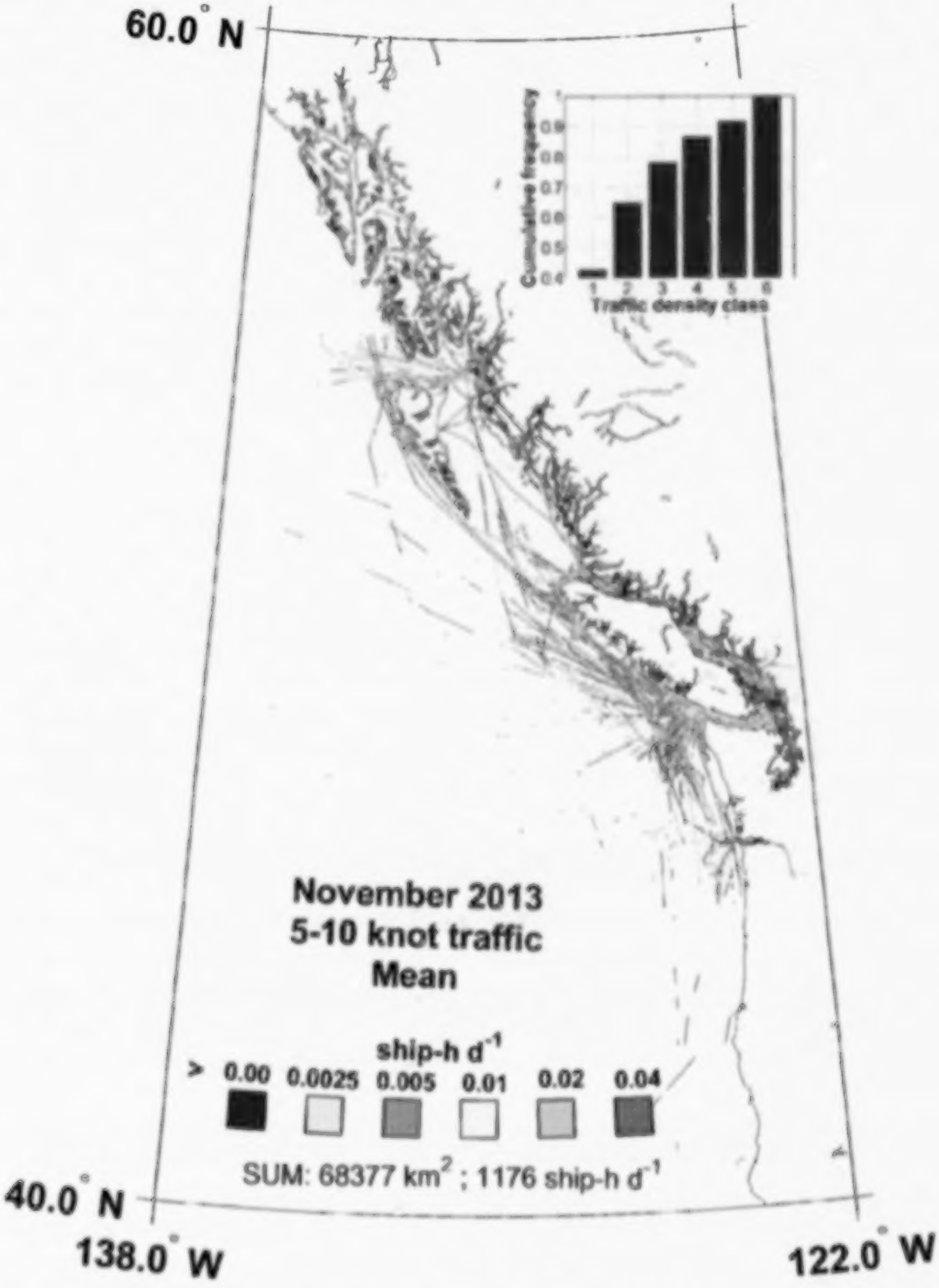

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
November 2013
5-10 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 68377 km² ; 1176 ship-h d⁻¹

Figure 275. Map of 5–10 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

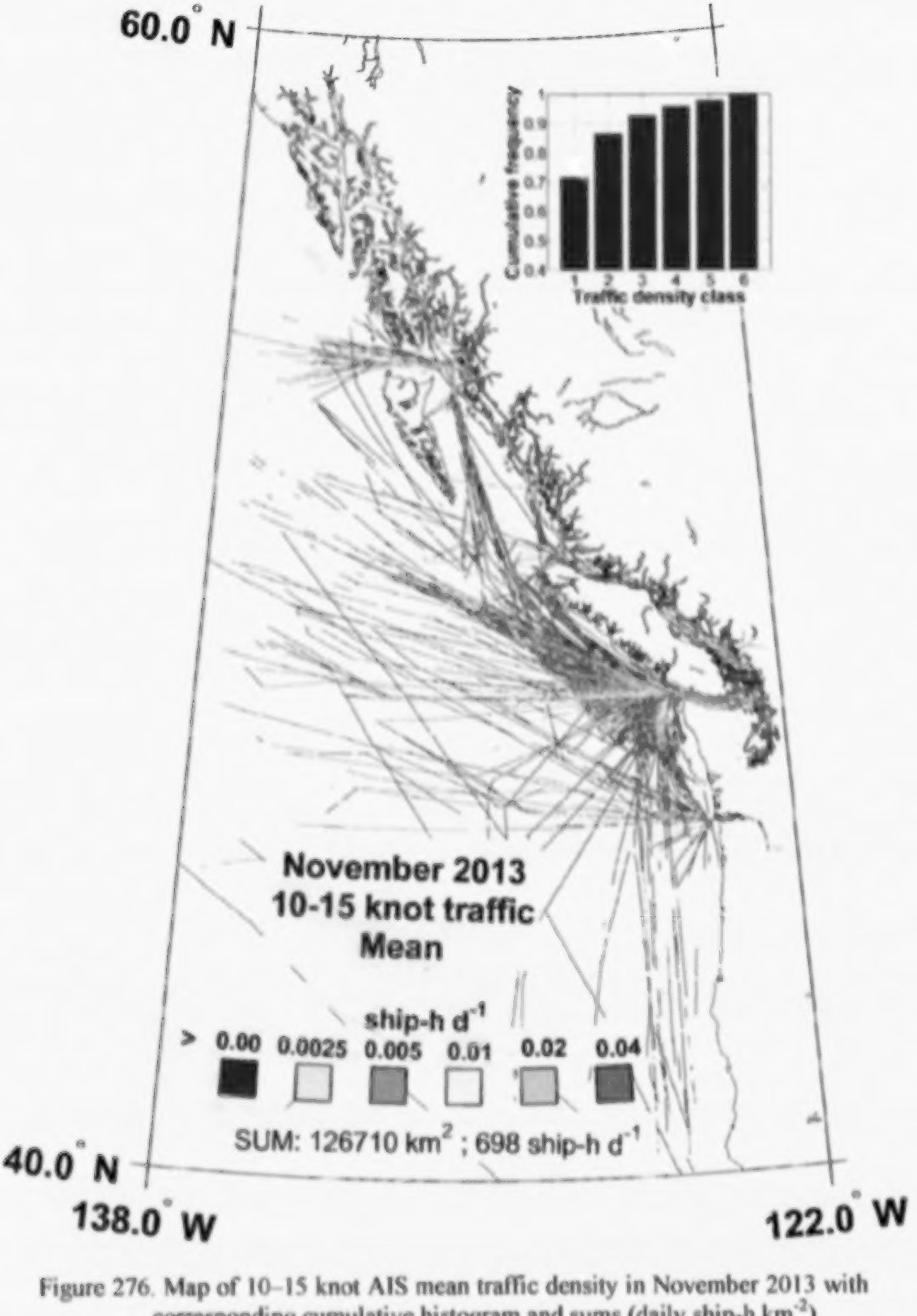

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
November 2013
10-15 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 126710 km^2 ; 698 ship-h d^{-1}

Figure 276. Map of 10–15 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

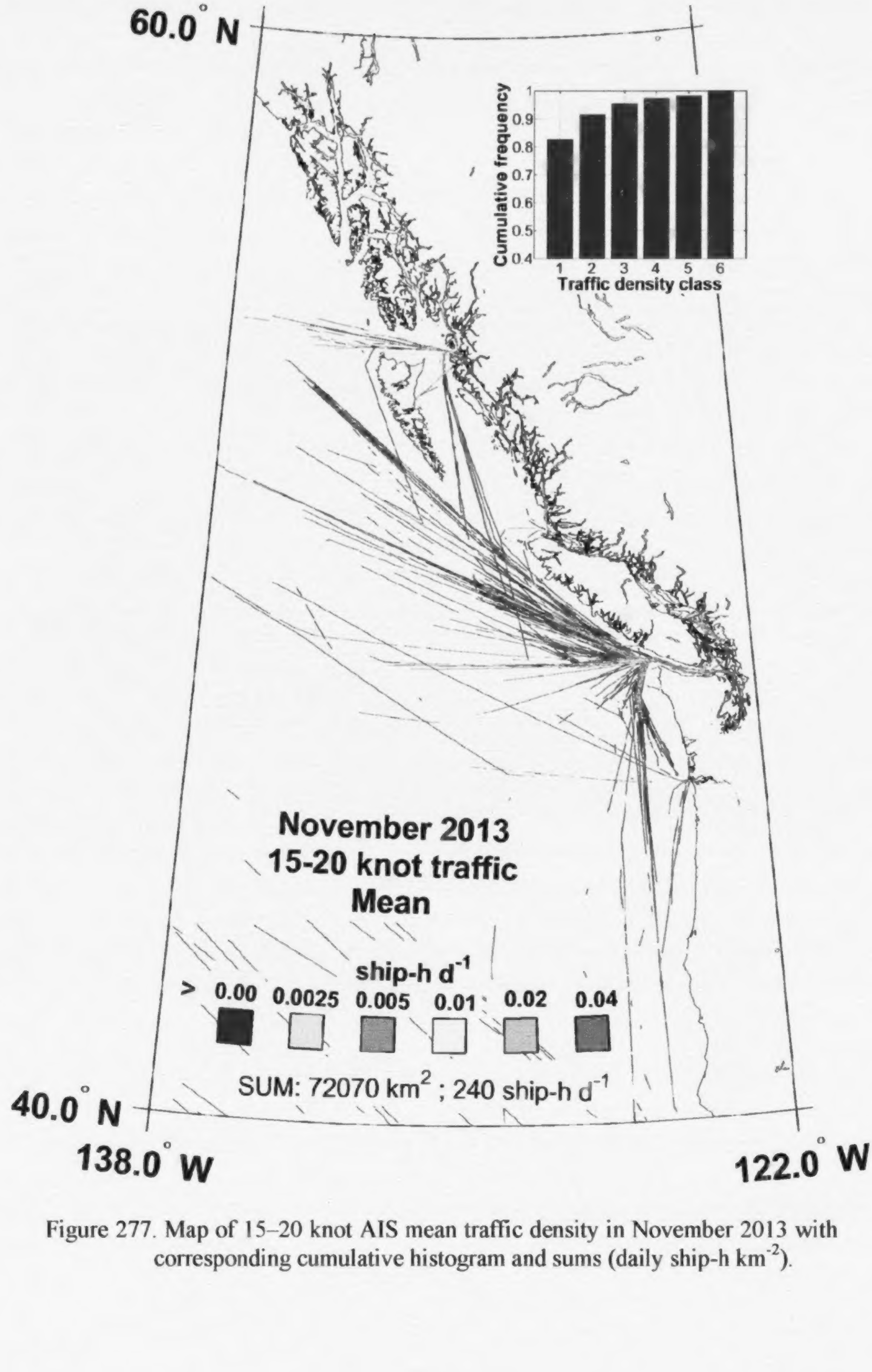

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
November 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 72070 km^2 ; 240 ship-h d^{-1}

Figure 277. Map of 15–20 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

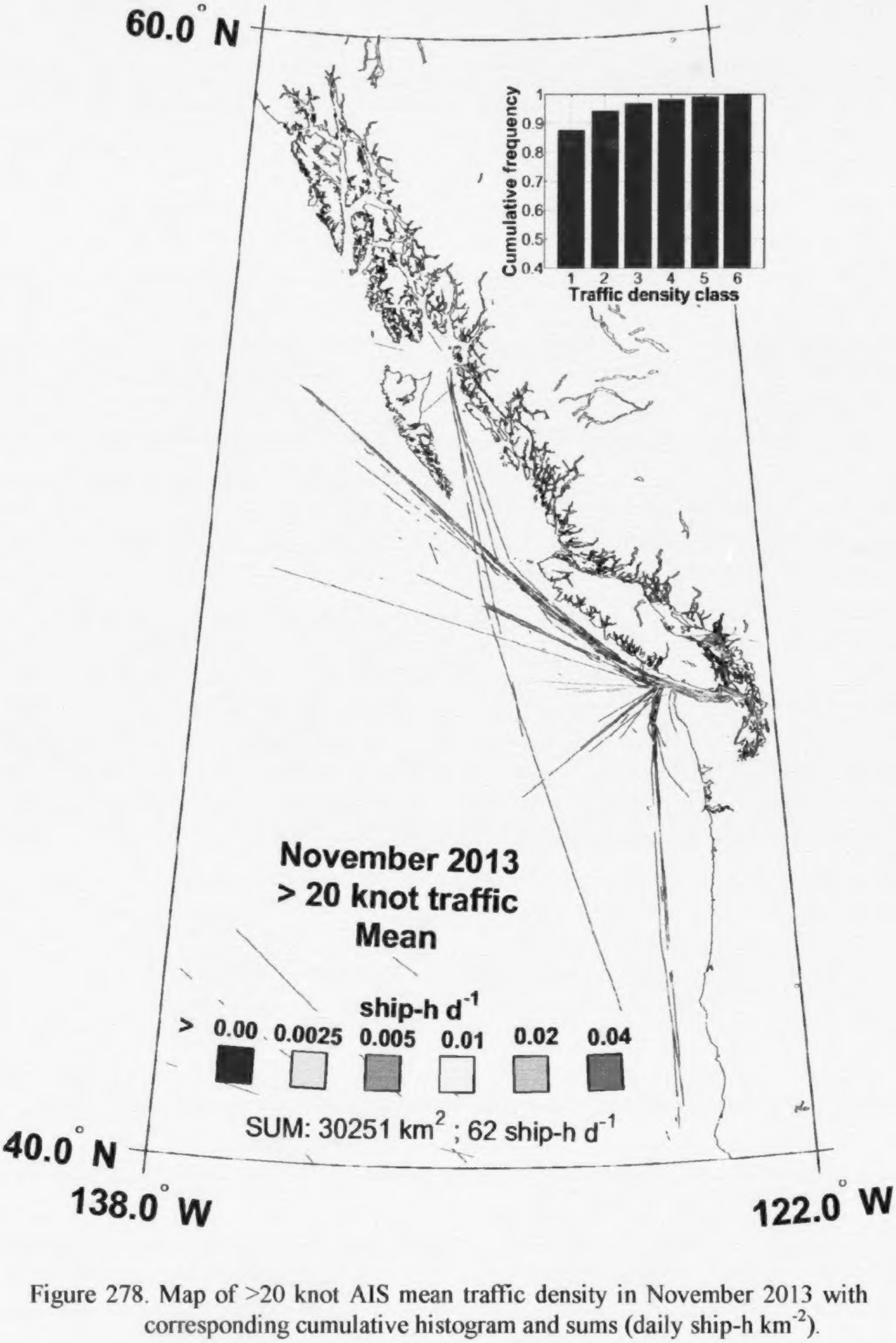

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
November 2013
> 20 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 30251 km² ; 62 ship-h d⁻¹

Figure 278. Map of >20 knot AIS mean traffic density in November 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

8.12. December 2013

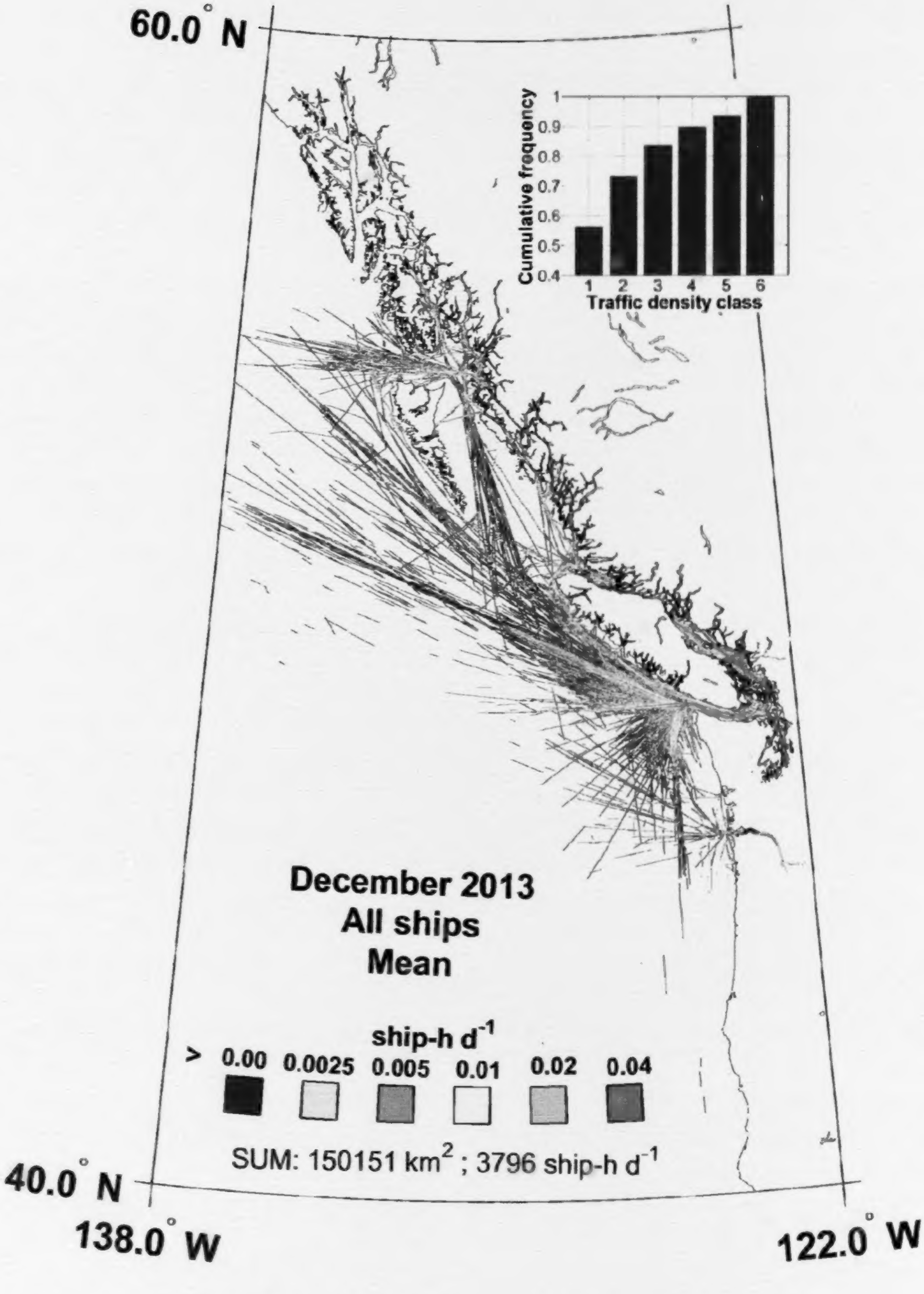

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
December 2013
All ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 150151 km² ; 3796 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 279. Map of AIS mean traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

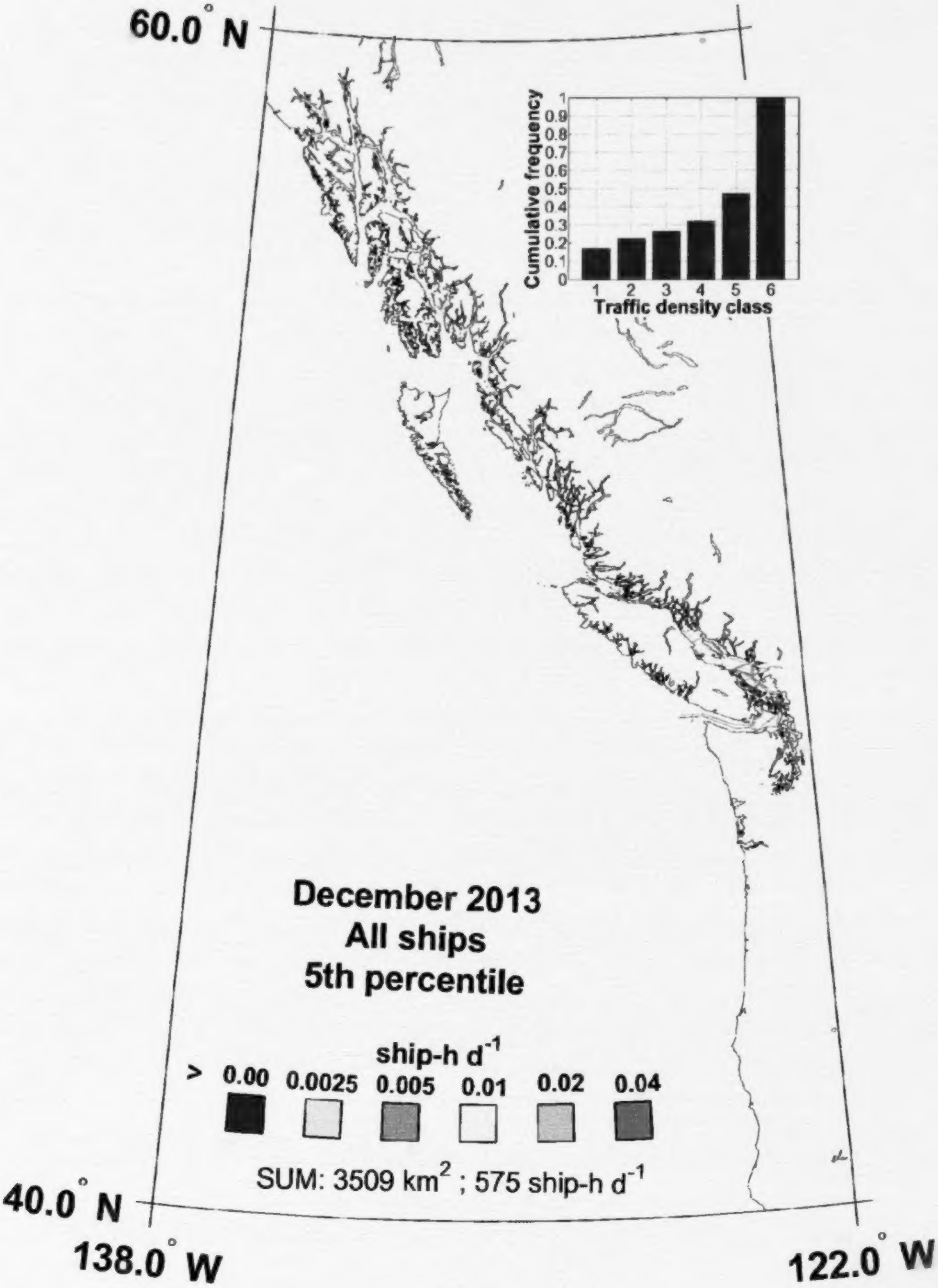

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
December 2013
All ships
5th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 3509 km^2 ; 575 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 280. Map of the 5th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 95% of the time, the traffic at a given location is higher than the displayed value; 5% of the time it is lower.

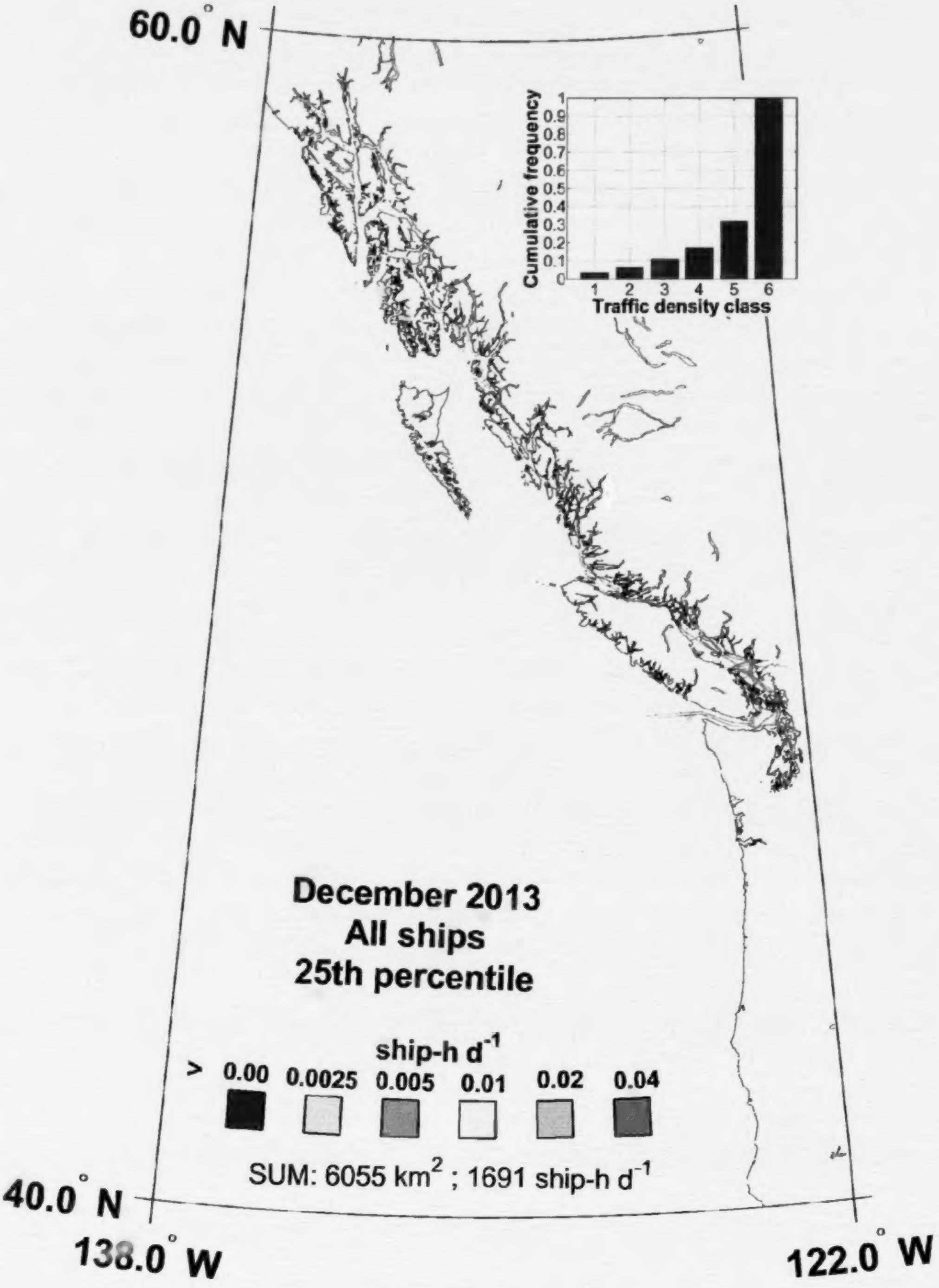

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
December 2013
All ships
25th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 6055 km^2 ; 1691 ship-h d^{-1}

Figure 281. Map of the 25th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 75% of the time, the traffic at a given location is higher than the displayed value; 25% of the time it is lower.

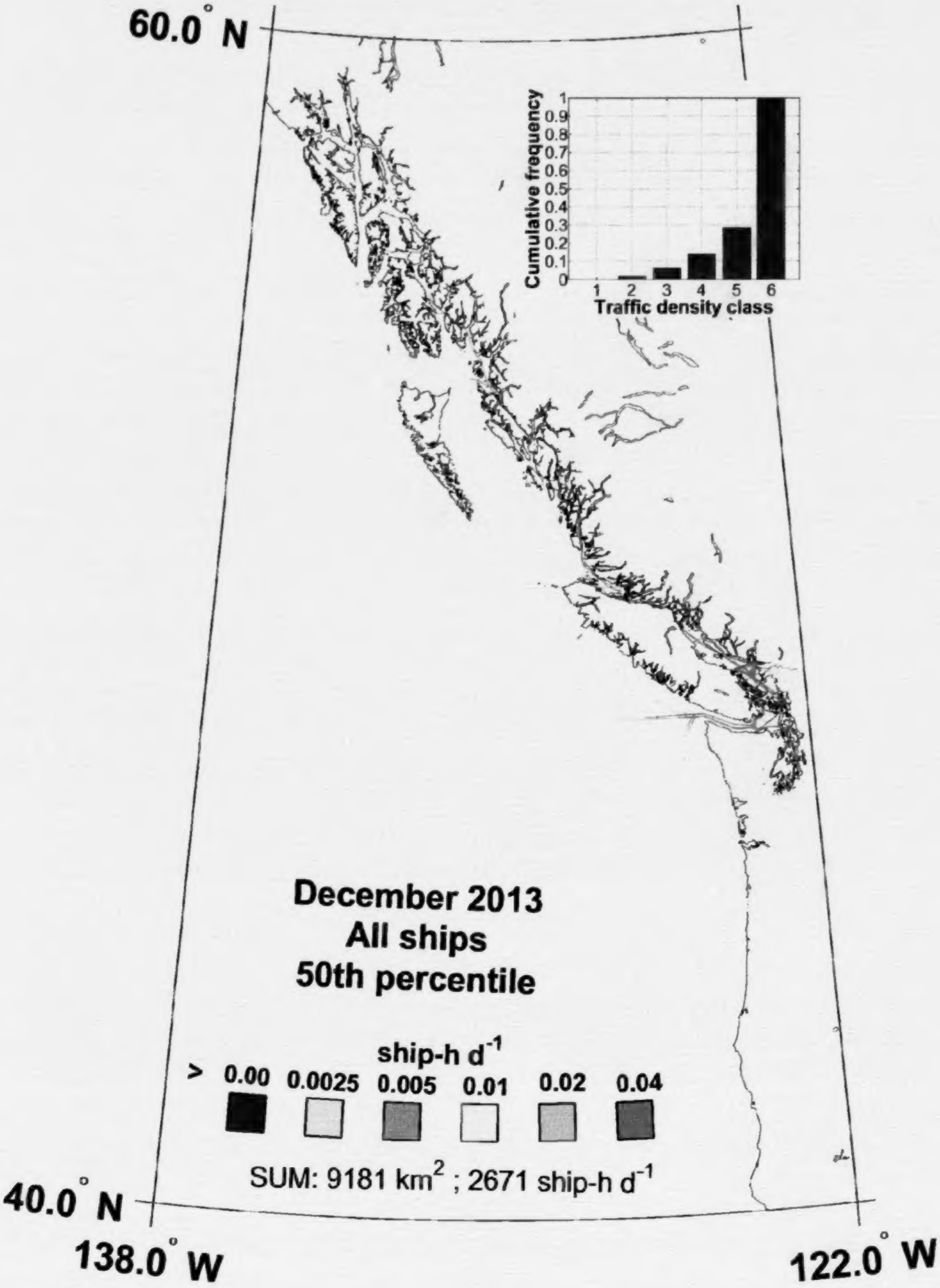

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
December 2013
All ships
50th percentile
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 9181 km2 ; 2671 ship-h d-1

Figure 282. Map of the 50th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 50% of the time, the traffic at a given location is higher than the displayed value; 50% of the time it is lower.

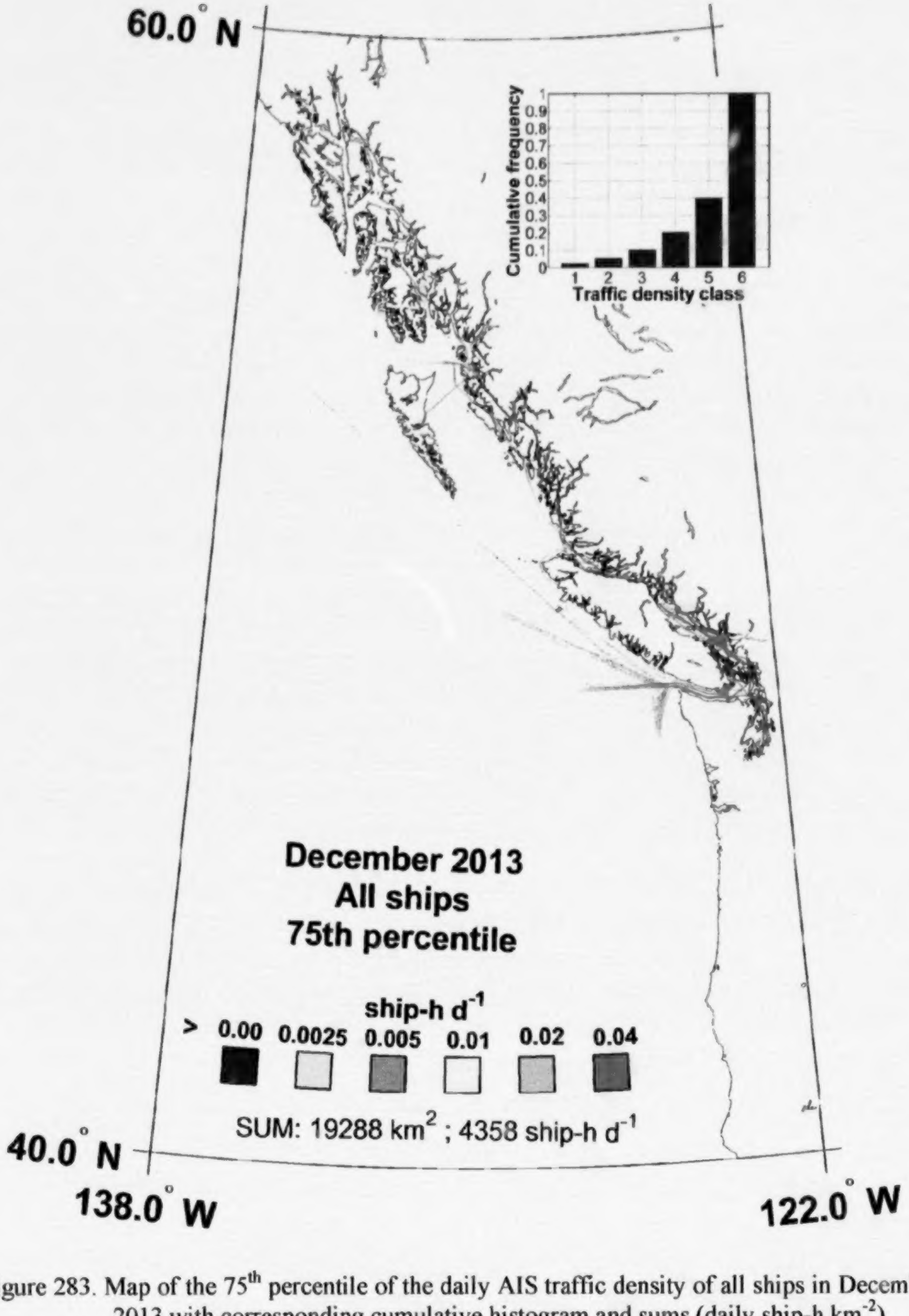

60.0° N
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
December 2013
All ships
75th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 19288 km^2 ; 4358 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 283. Map of the 75th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 25% of the time, the traffic at a given location is higher than the displayed value; 75% of the time it is lower.

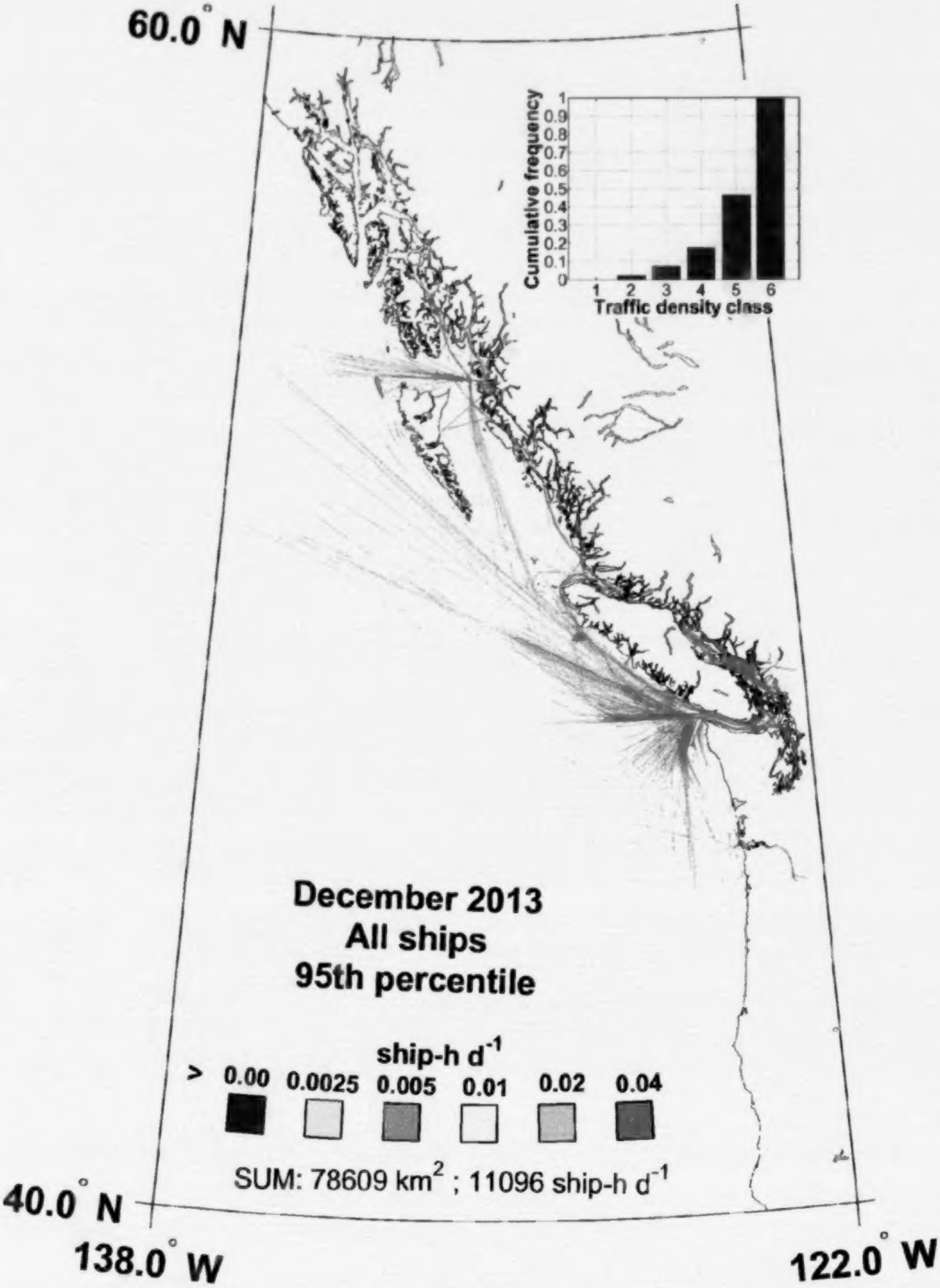

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
December 2013
All ships
95th percentile
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 78609 km^2 ; 11096 ship-h d^{-1}

Figure 284. Map of the 95th percentile of the daily AIS traffic density of all ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}). Interpretation: 5% of the time, the traffic at a given location is higher than the displayed value; 95% of the time it is lower.

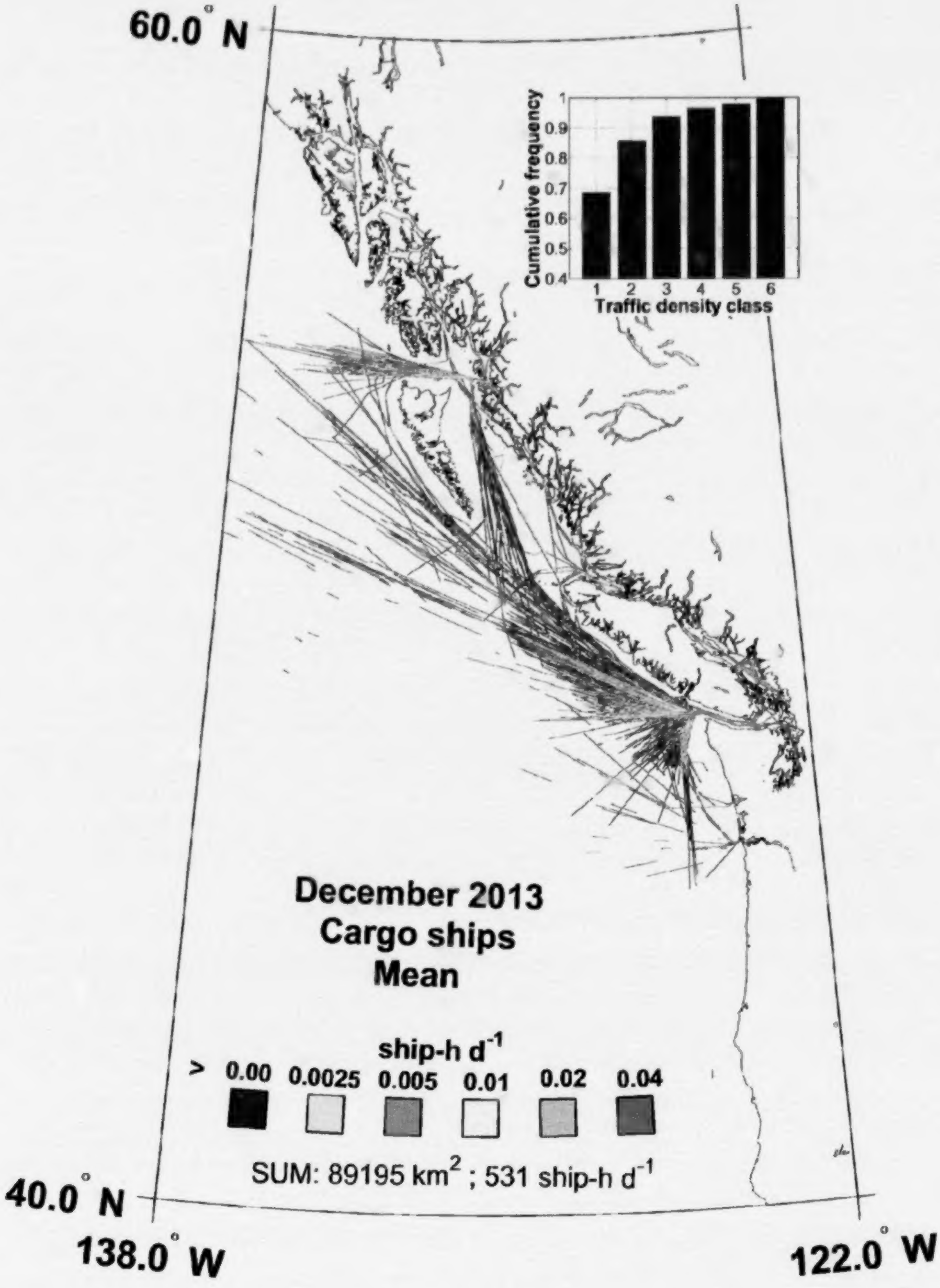

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
Cargo ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 89195 km^2 ; 531 ship-h d^{-1}

Figure 285. Map of AIS mean traffic density of cargo-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

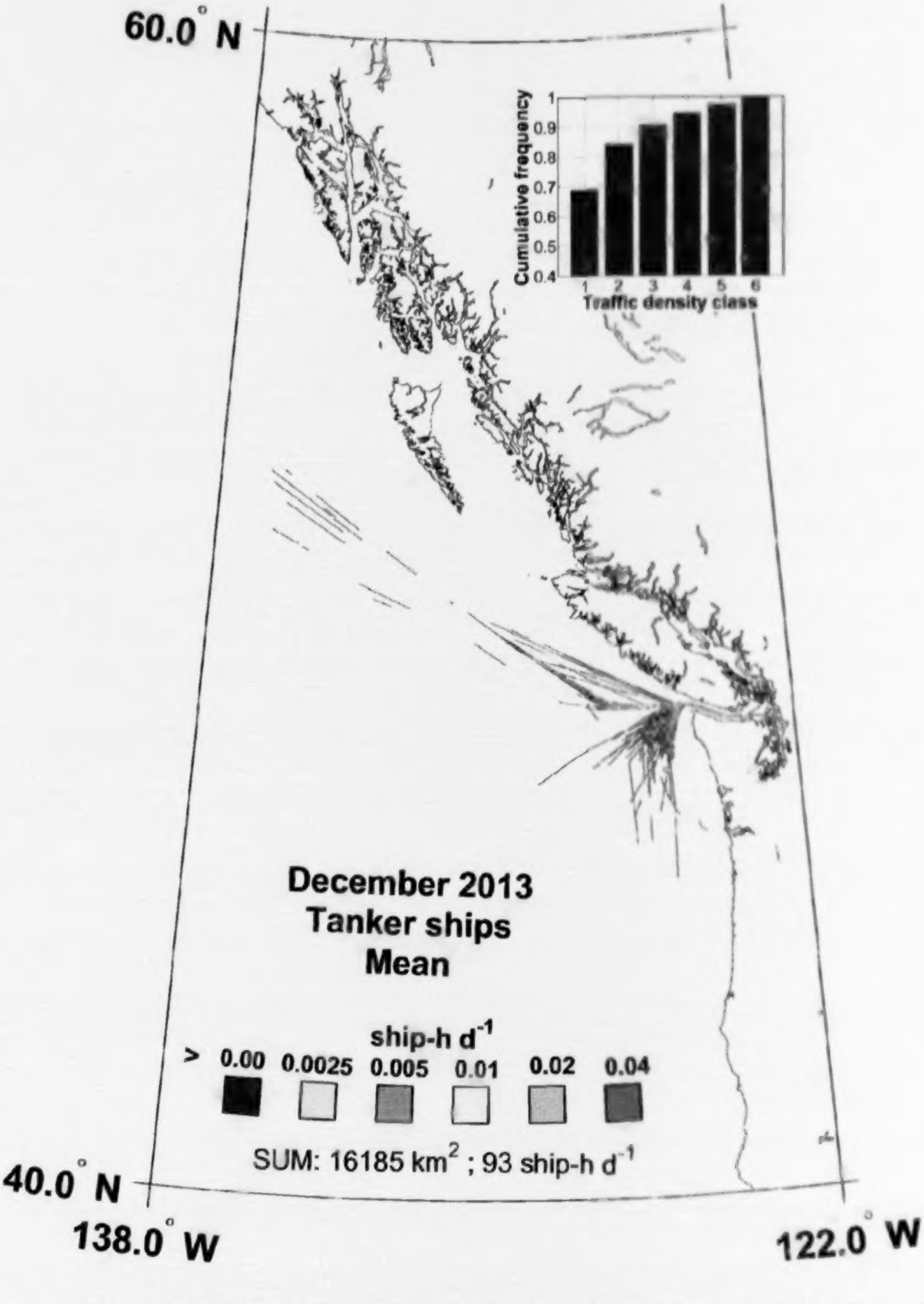

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
December 2013
Tanker ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 16185 km^2 ; 93 ship-h d^{-1}

Figure 286. Map of AIS mean traffic density of tanker-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

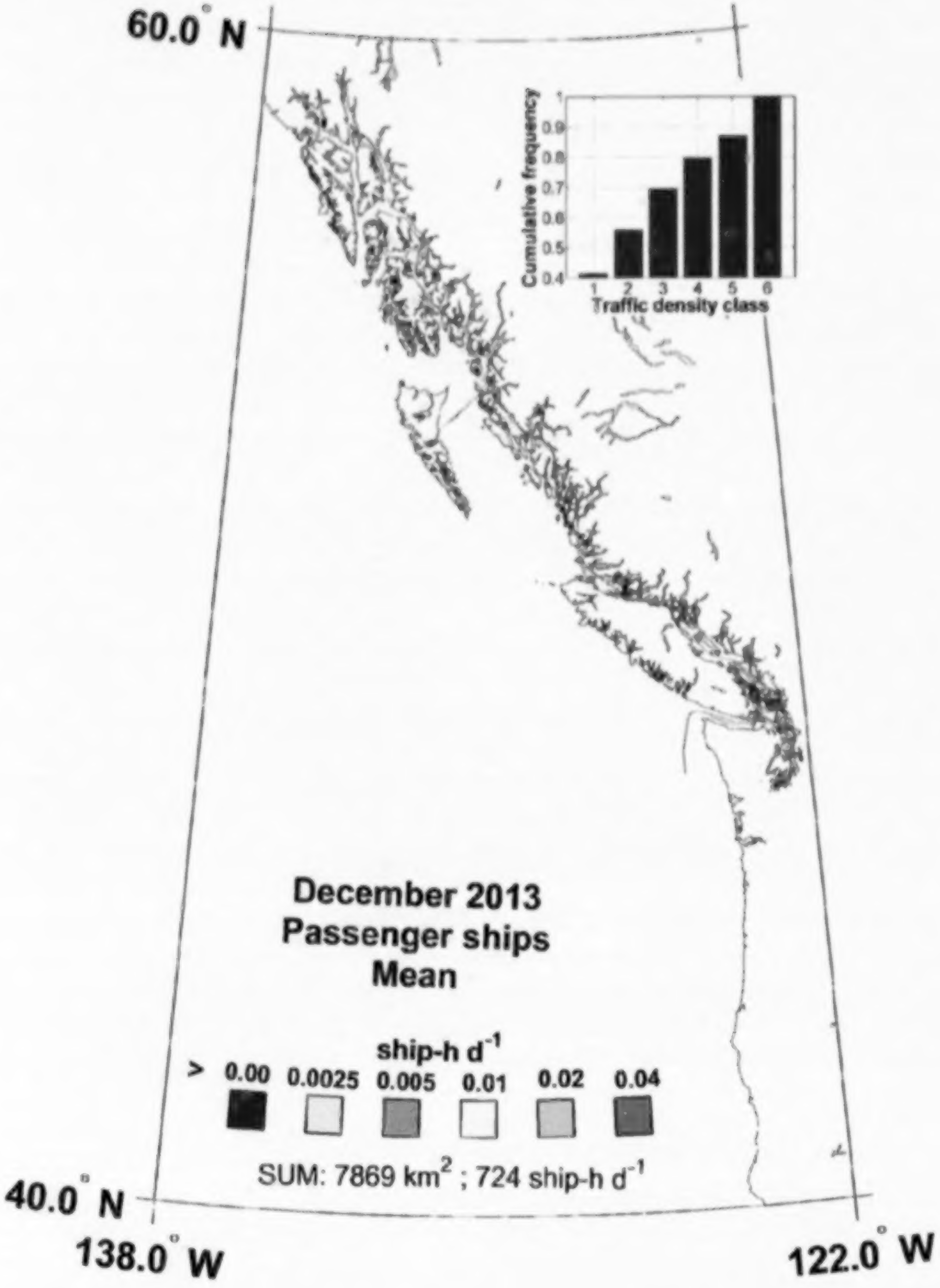

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
Passenger ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 7869 km² ; 724 ship-h d⁻¹
40.0° N
138.0° W
122.0° W

Figure 287. Map of AIS mean traffic density of passenger-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

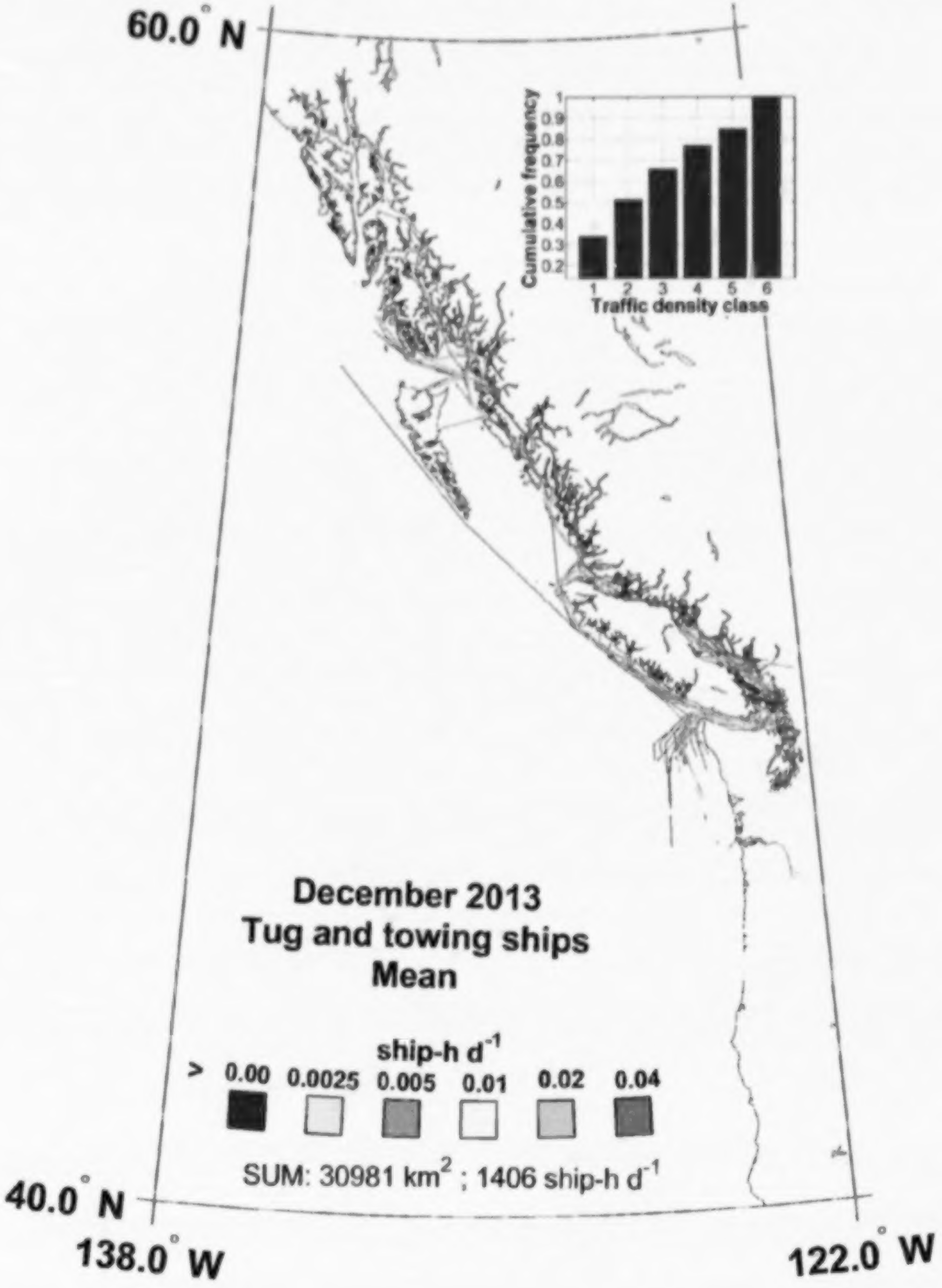

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
December 2013
Tug and towing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 30981 km^2 ; 1406 ship-h d^{-1}

Figure 288. Map of AIS mean traffic density of tug and towing -type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

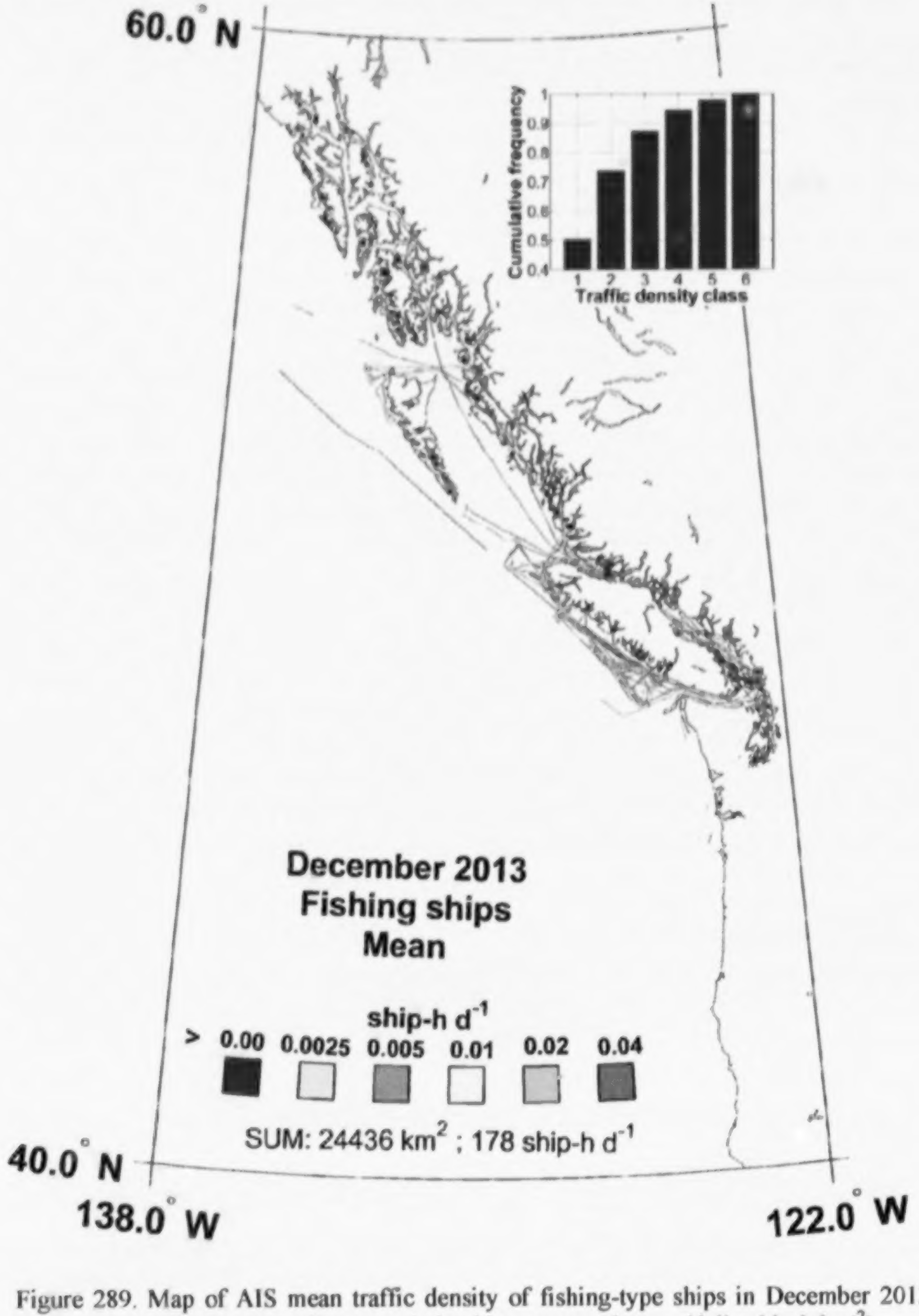

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
Fishing ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 24436 km^2 ; 178 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 289. Map of AIS mean traffic density of fishing-type ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

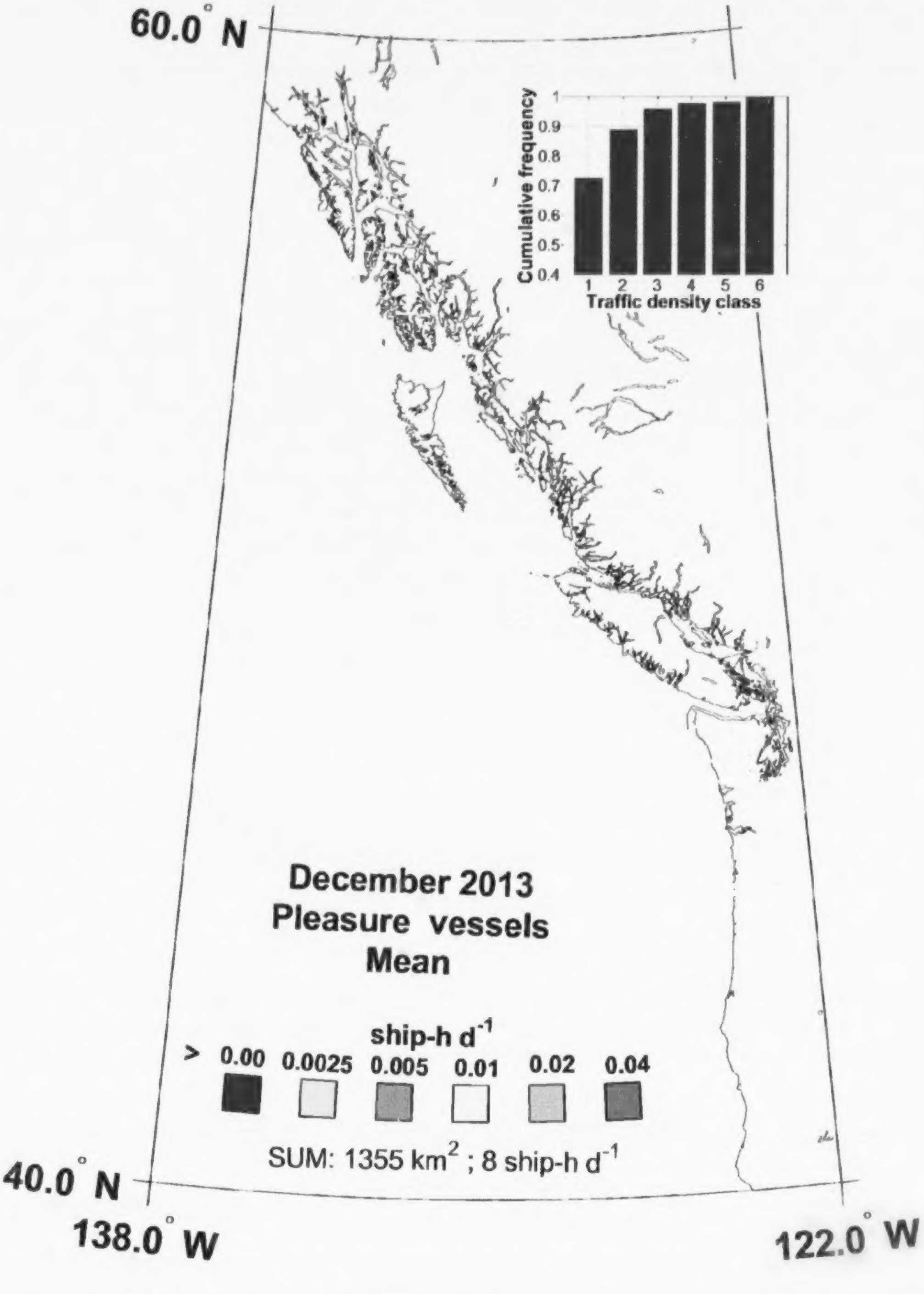

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
Pleasure vessels
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 1355 km^2 ; 8 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 290. Map of AIS mean traffic density of pleasure-type vessels in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

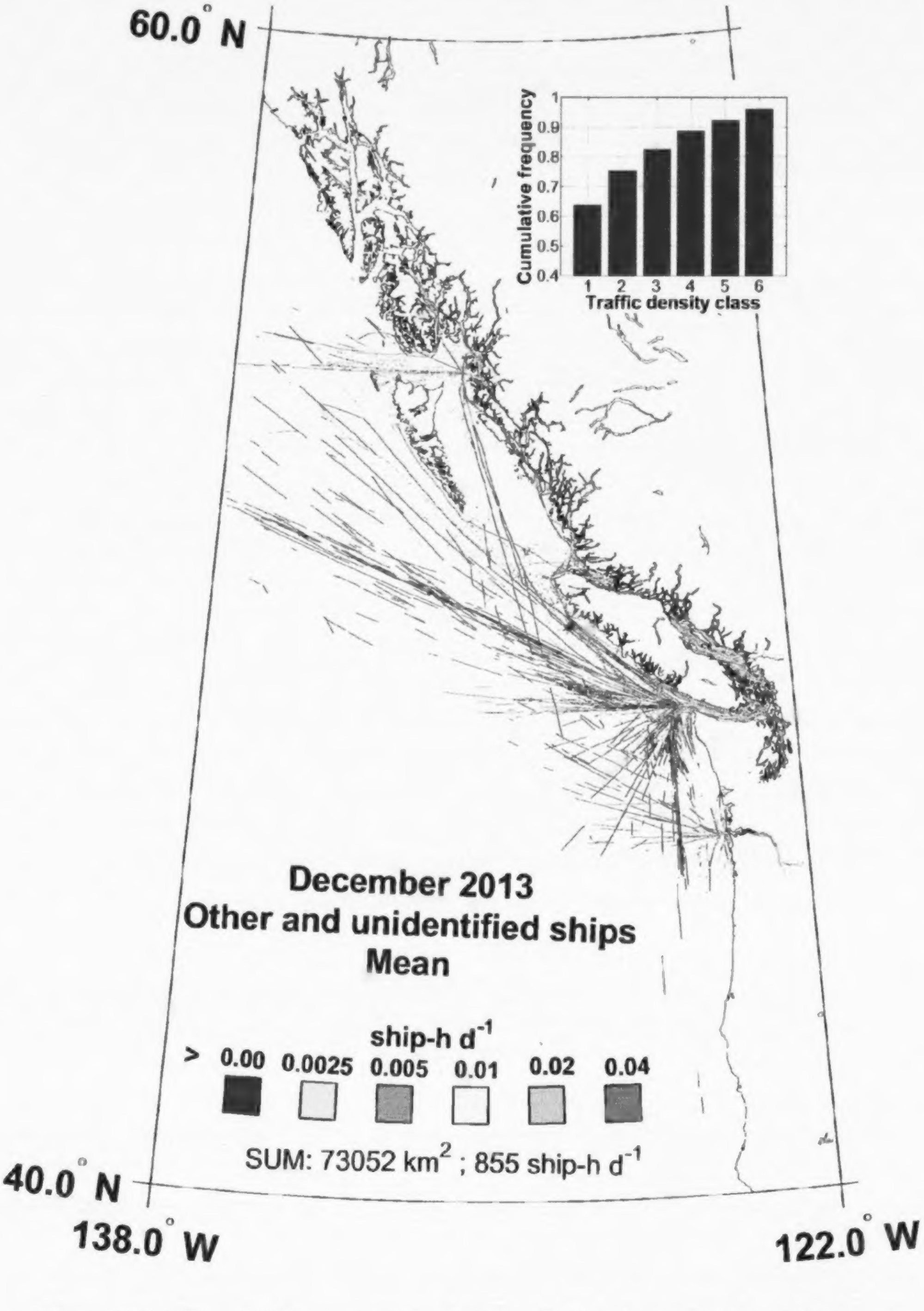

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
Other and unidentified ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 73052 km² ; 855 ship-h d⁻¹

Figure 291. Map of AIS mean traffic density of other type of ships and ships of unidentified type in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

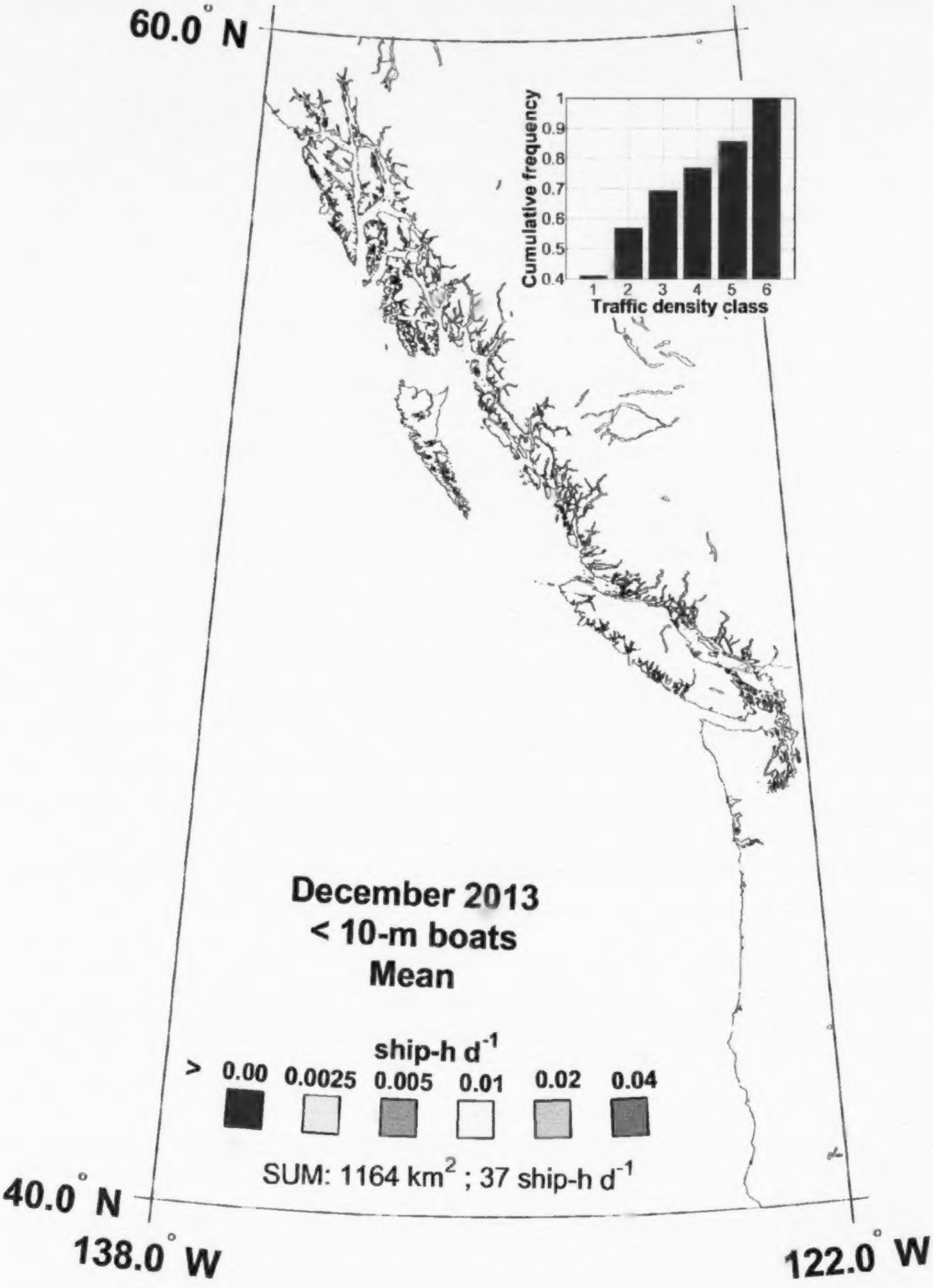

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
< 10-m boats
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 1164 km^2 ; 37 ship-h d^{-1}

Figure 292. Map of AIS mean traffic density of ships with lengths < 10 min December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

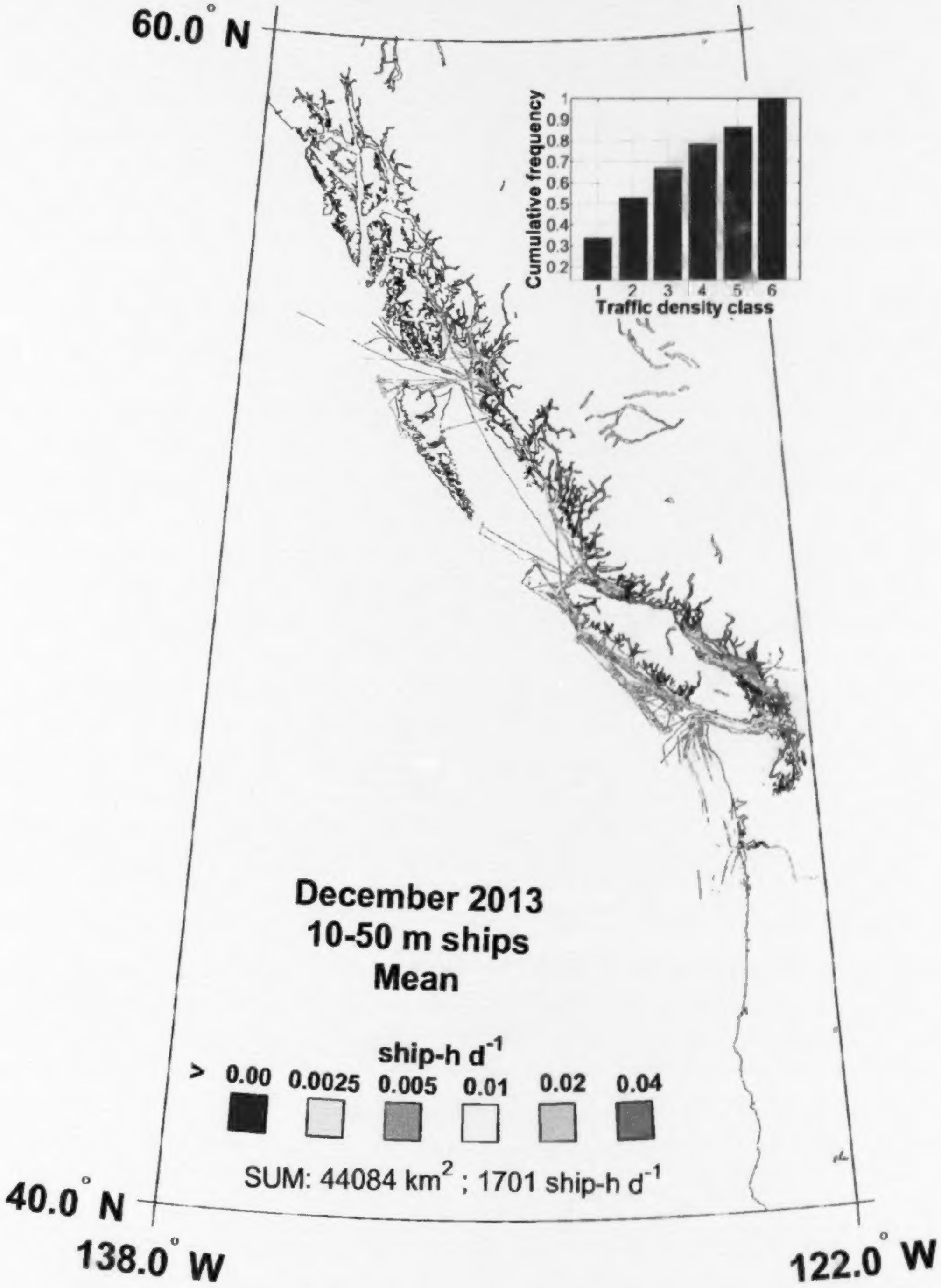

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1
2
3
4
5
6
Traffic density class
December 2013
10-50 m ships
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 44084 km² ; 1701 ship-h d⁻¹

Figure 293. Map of AIS mean traffic density of 10 to 50 m ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

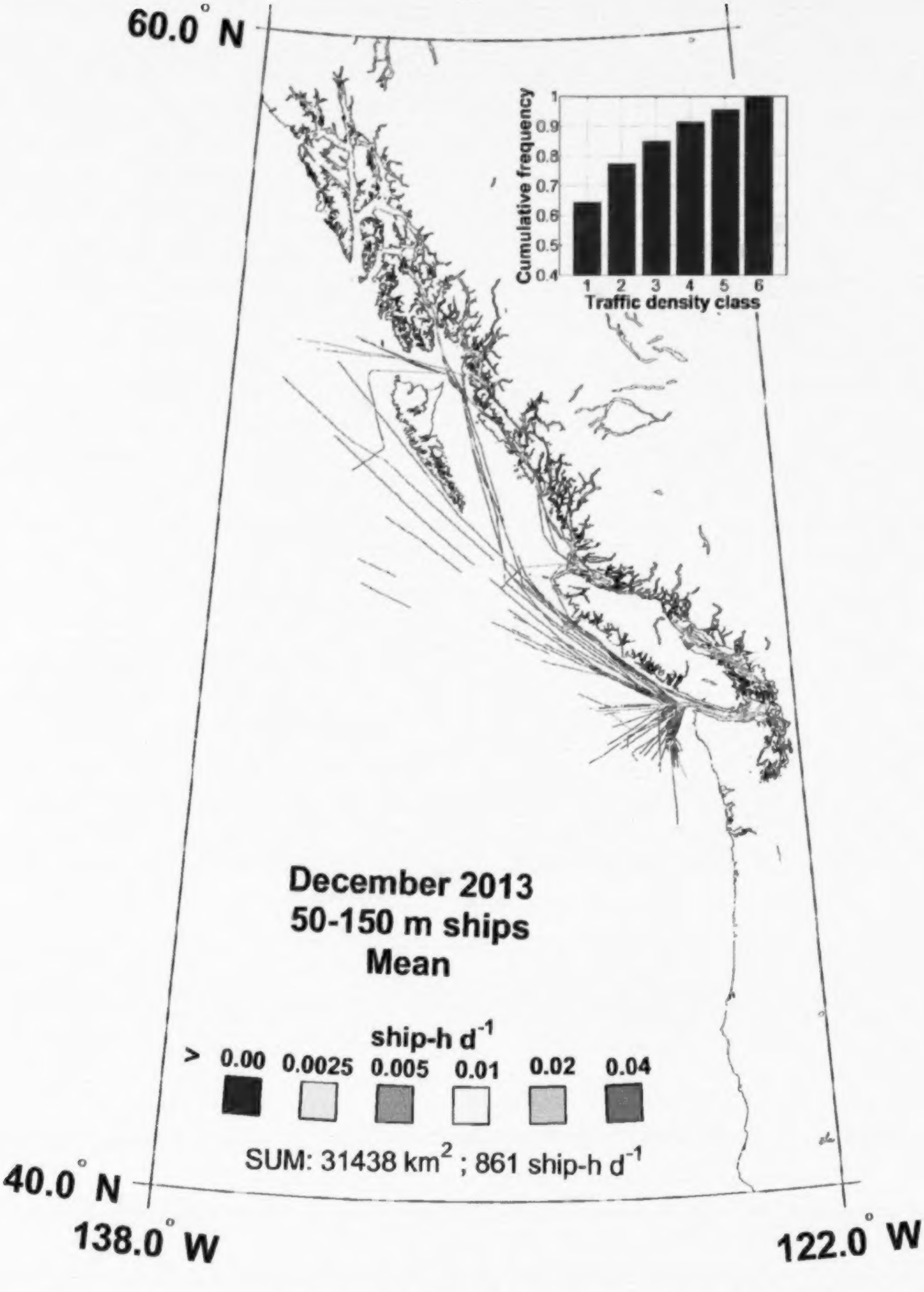

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
50-150 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 31438 km^2 ; 861 ship-h d^{-1}

Figure 294. Map of AIS mean traffic density of 50 to 150 m ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

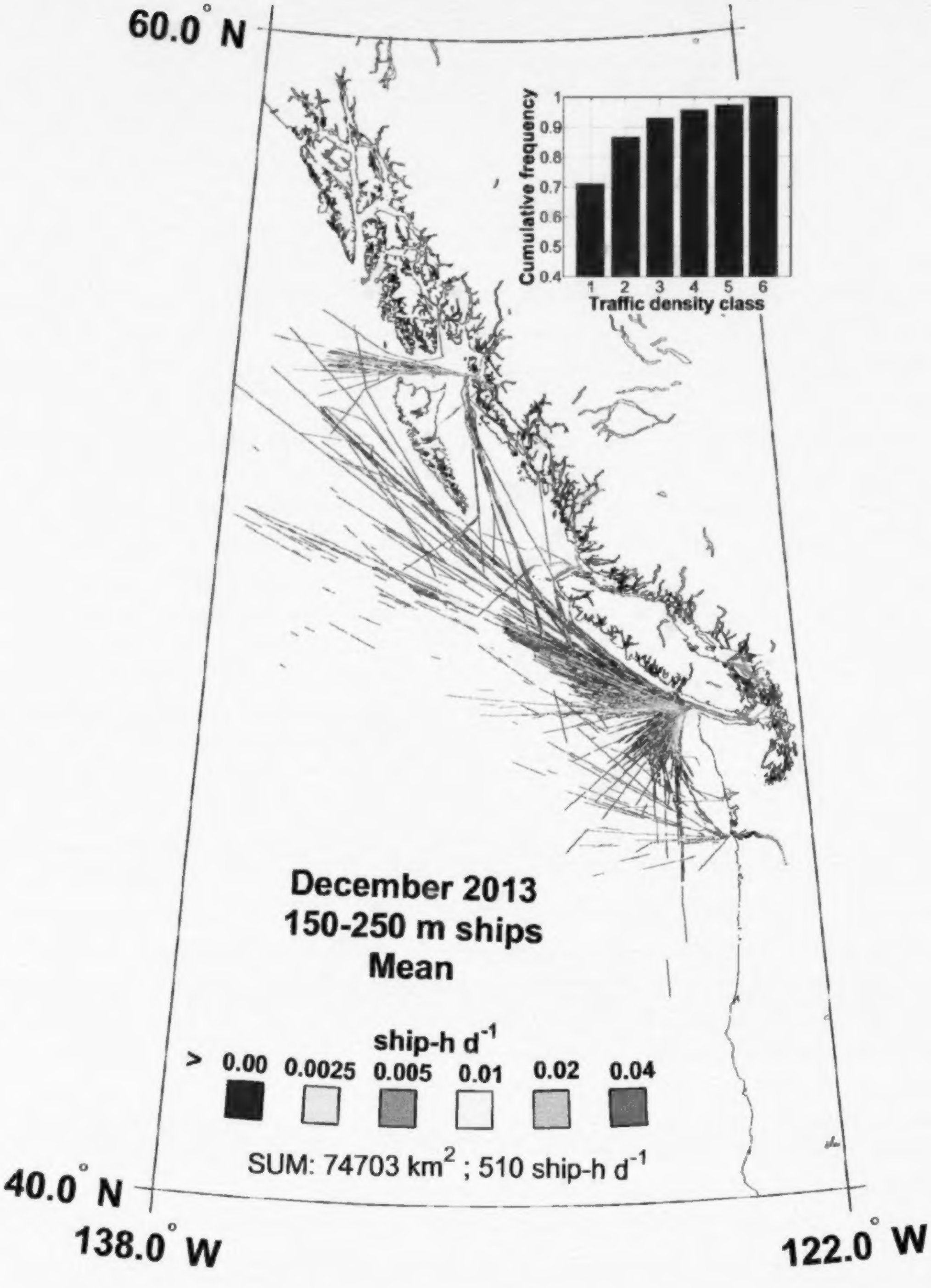

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
December 2013
150-250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 74703 km^2 ; 510 ship-h d^{-1}

Figure 295. Map of AIS mean traffic density of 150 to 250 m ships in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

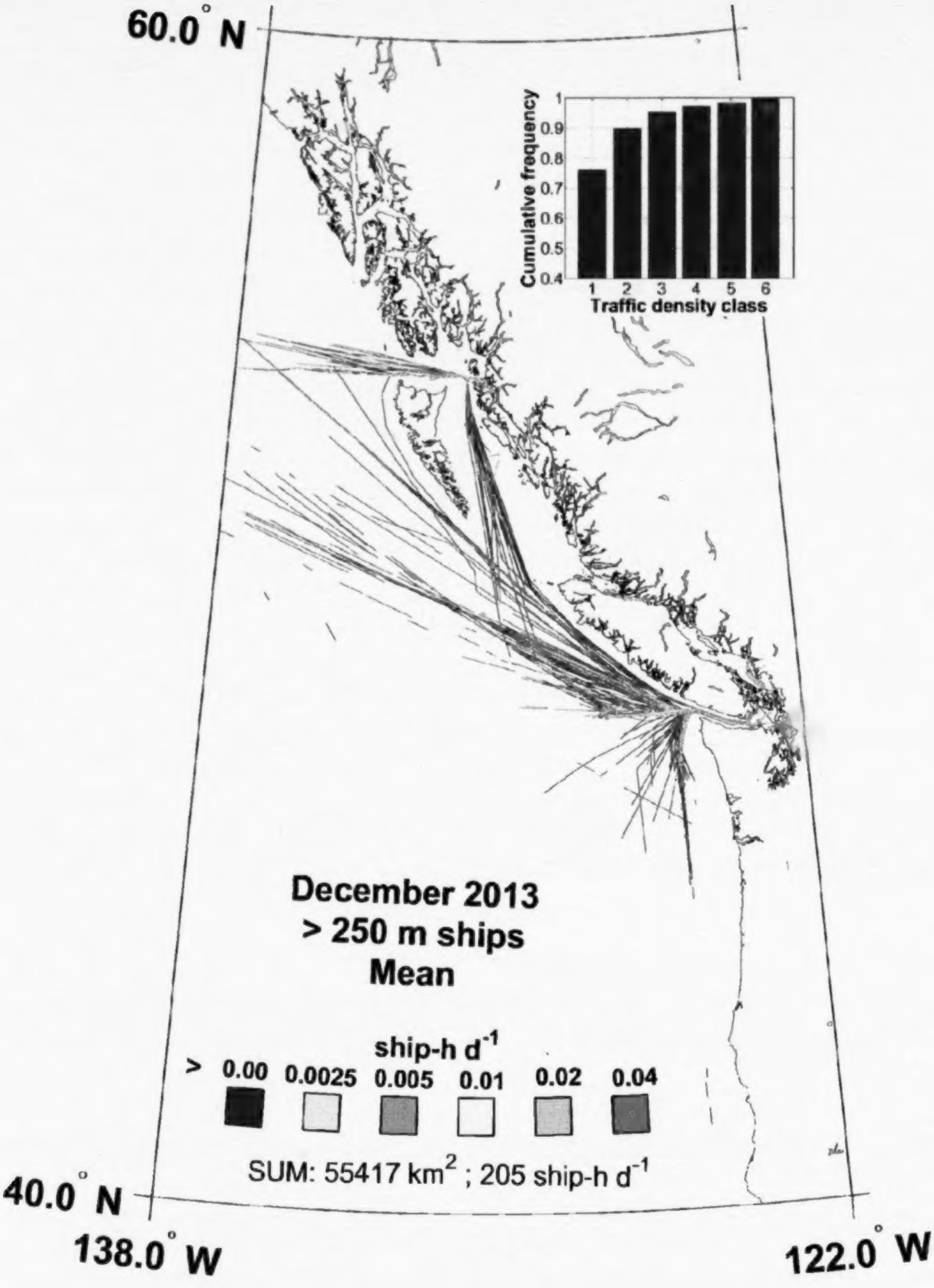

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
> 250 m ships
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 55417 km^2 ; 205 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 296. Map of >250 m ship AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

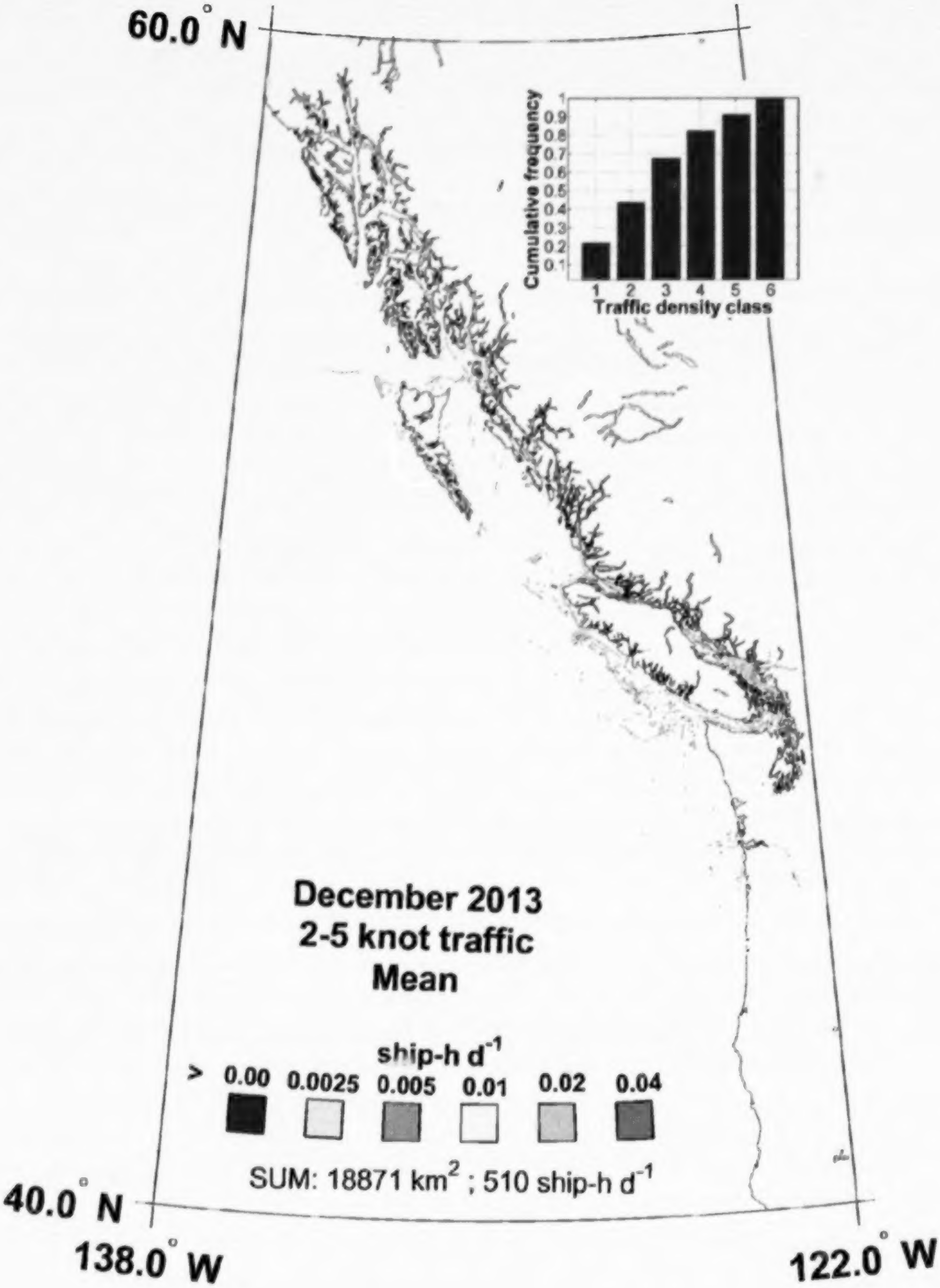

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1 2 3 4 5 6
Traffic density class
December 2013
2-5 knot traffic
Mean
ship-h d⁻¹
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 18871 km² ; 510 ship-h d⁻¹

Figure 297. Map of 2–5 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

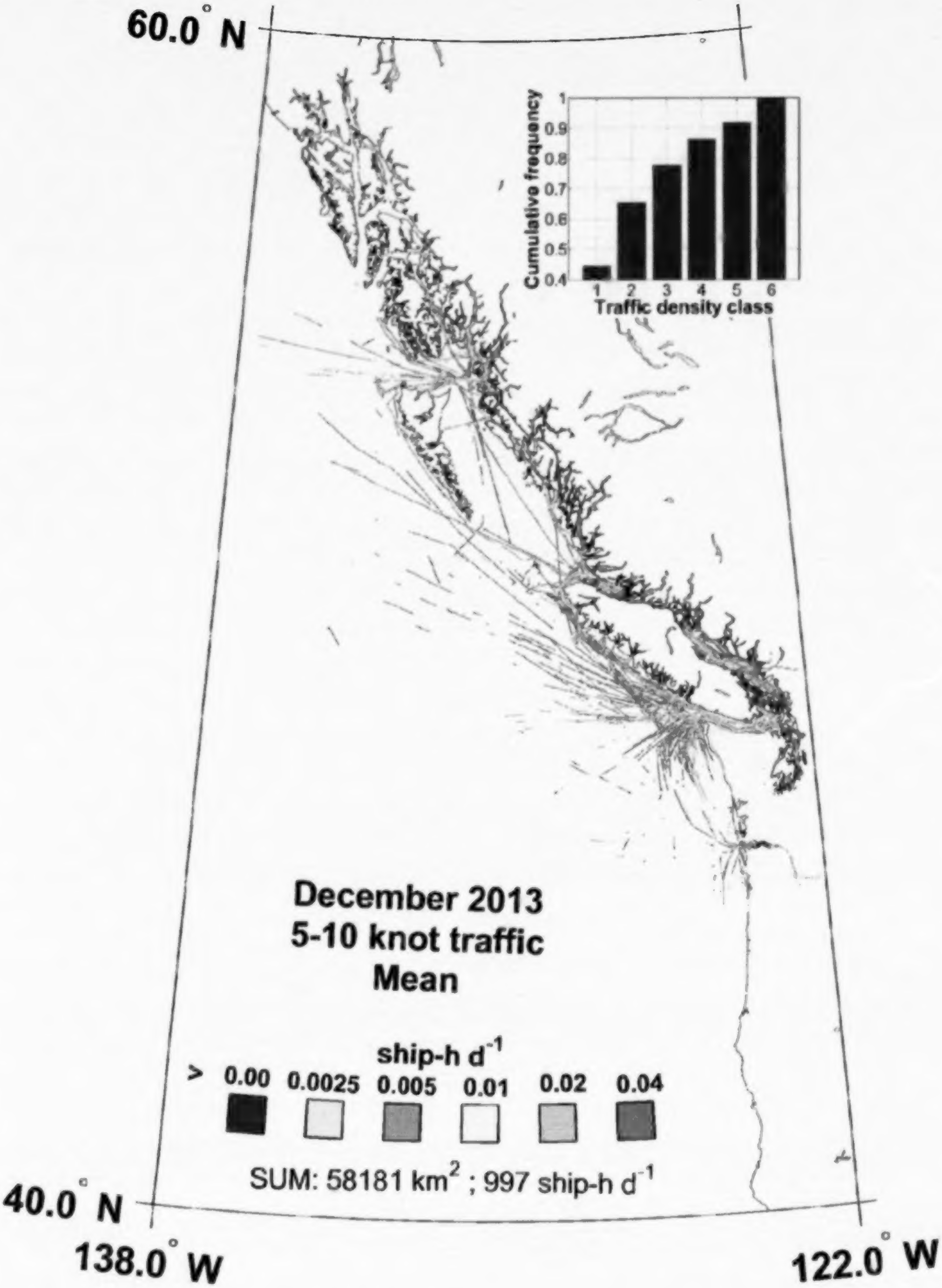

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
5-10 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 58181 km^2 ; 997 ship-h d^{-1}
40.0° N
138.0° W
122.0° W

Figure 298. Map of 5–10 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

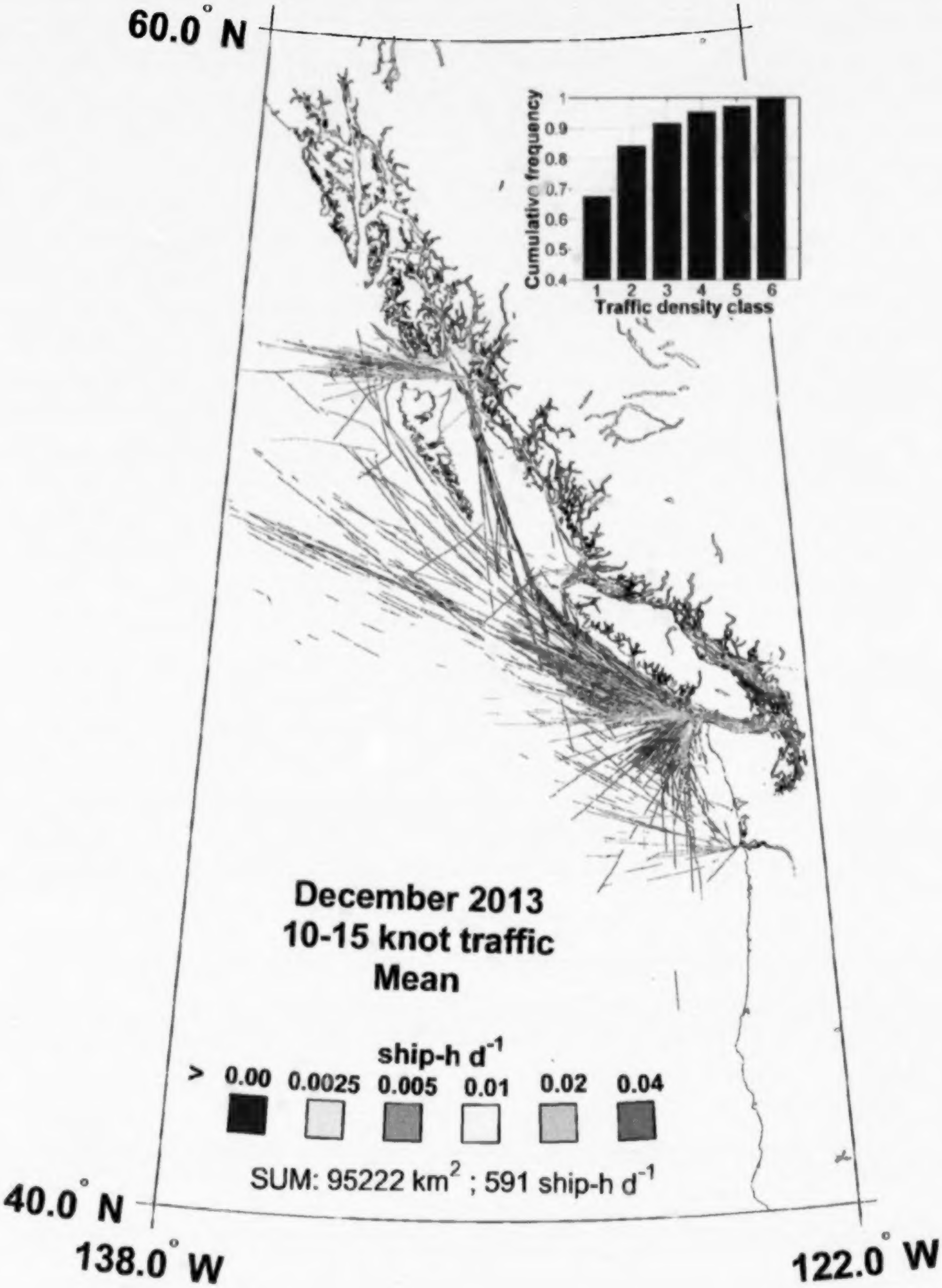

60.0° N
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1
2
3
4
5
6
Traffic density class
December 2013
10-15 knot traffic
Mean
ship-h d-1
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 95222 km2 ; 591 ship-h d-1
40.0° N
138.0° W
122.0° W

Figure 299. Map of 10–15 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

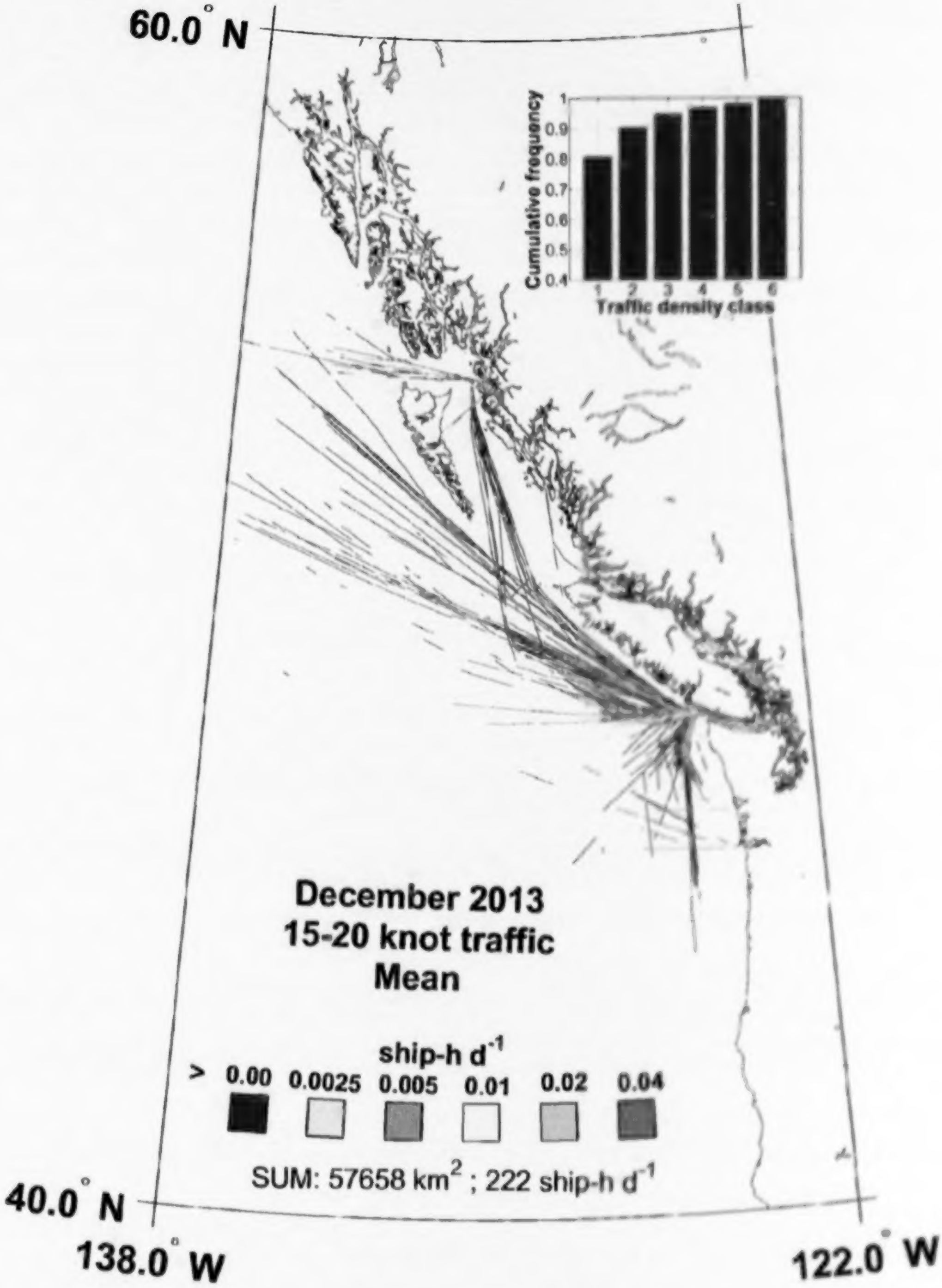

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
15-20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 57658 km^2 ; 222 ship-h d^{-1}

Figure 300. Map of 15–20 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).

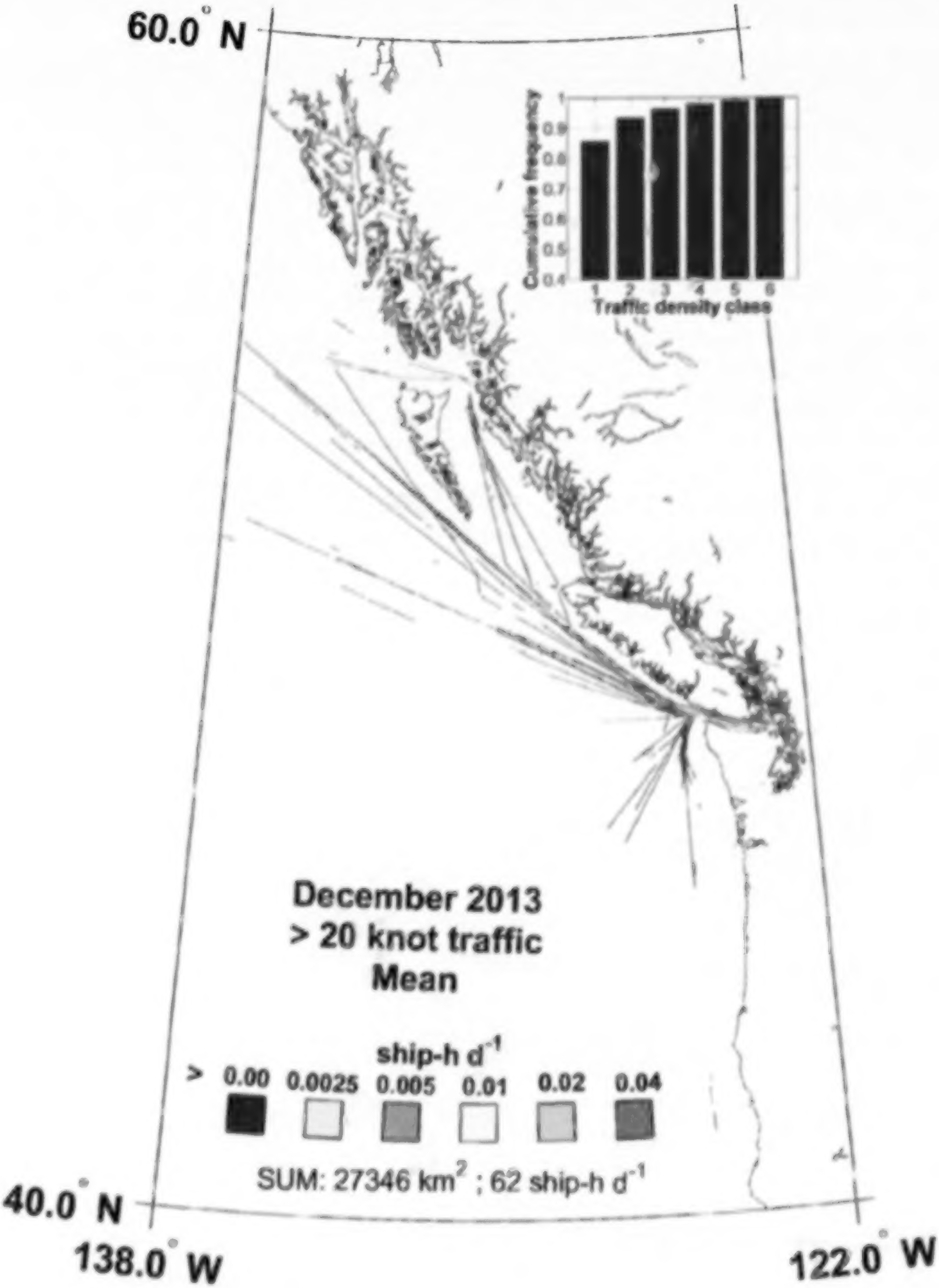

60.0° N
40.0° N
138.0° W
122.0° W
Cumulative frequency
1
0.9
0.8
0.7
0.6
0.5
0.4
1 2 3 4 5 6
Traffic density class
December 2013
> 20 knot traffic
Mean
ship-h d^{-1}
> 0.00
0.0025
0.005
0.01
0.02
0.04
SUM: 27346 km^2 ; 62 ship-h d^{-1}

Figure 301. Map of >20 knot AIS mean traffic density in December 2013 with corresponding cumulative histogram and sums (daily ship-h km^{-2}).